FIG. 1(a)

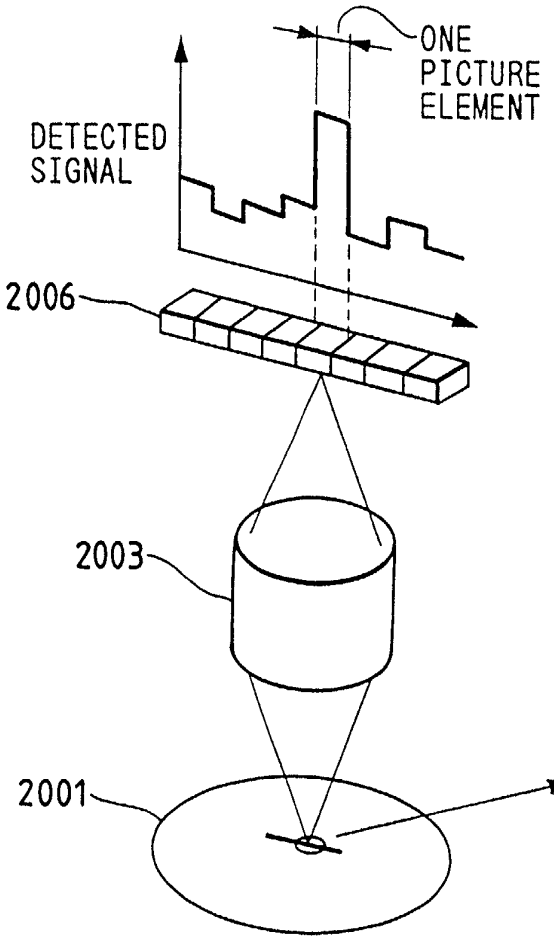


FIG. 1(c)

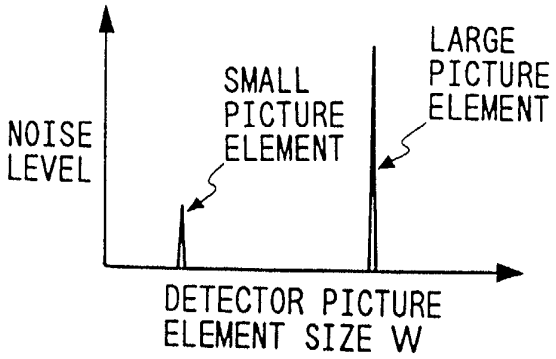


FIG. 1(b)

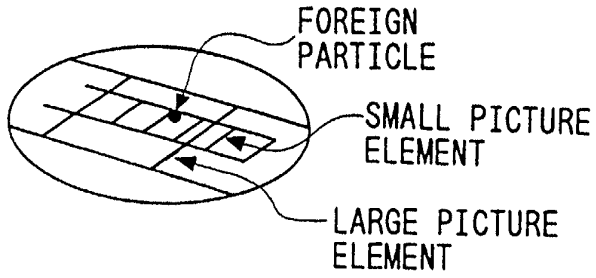


FIG. 2

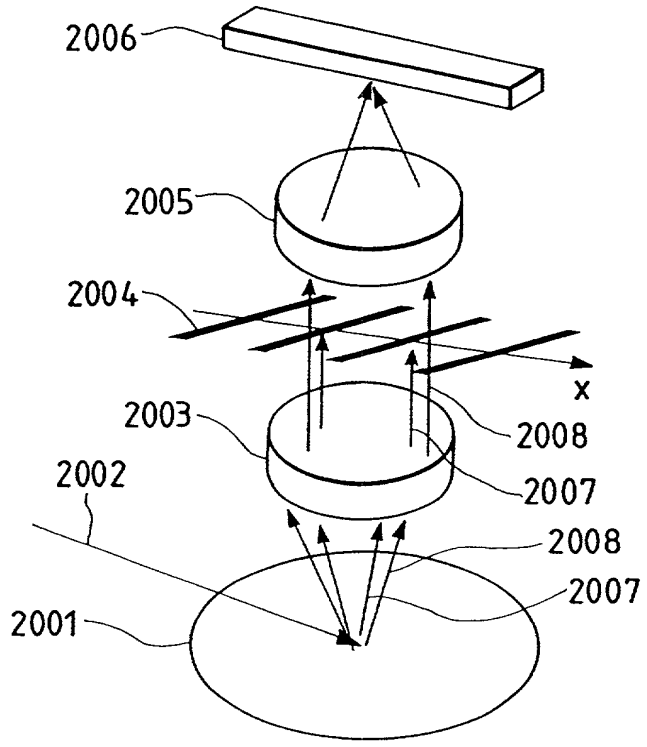

2006
2005
2004
X
2003
2008
2002
2007
2008
2007
2001

FIG. 3

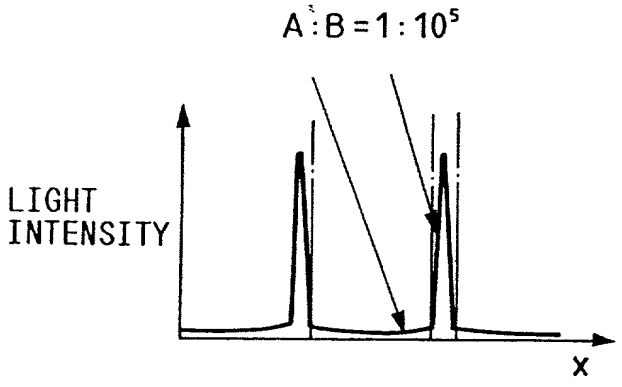

A:B=1:10⁵
LIGHT
INTENSITY
X

FIG. 4

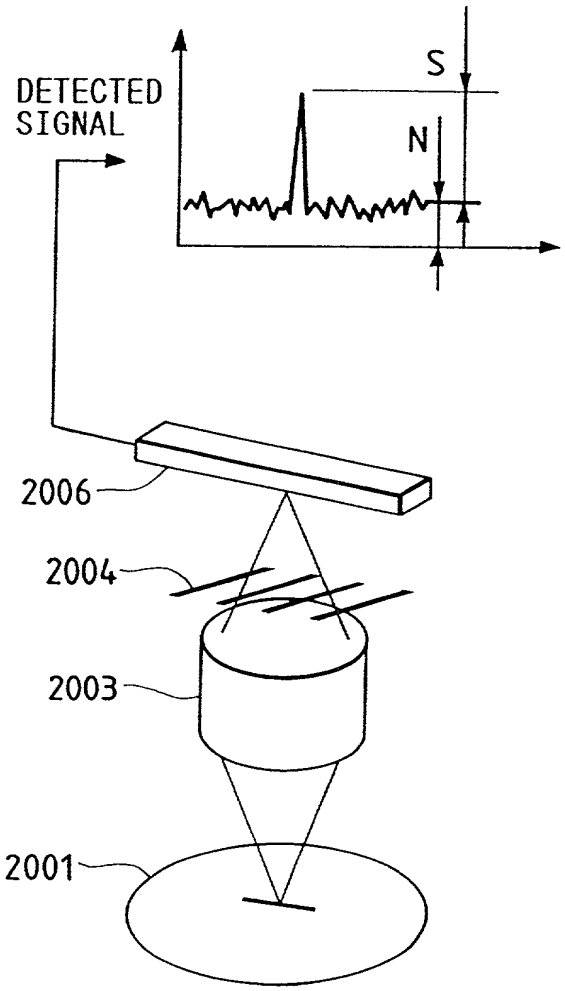


FIG. 5

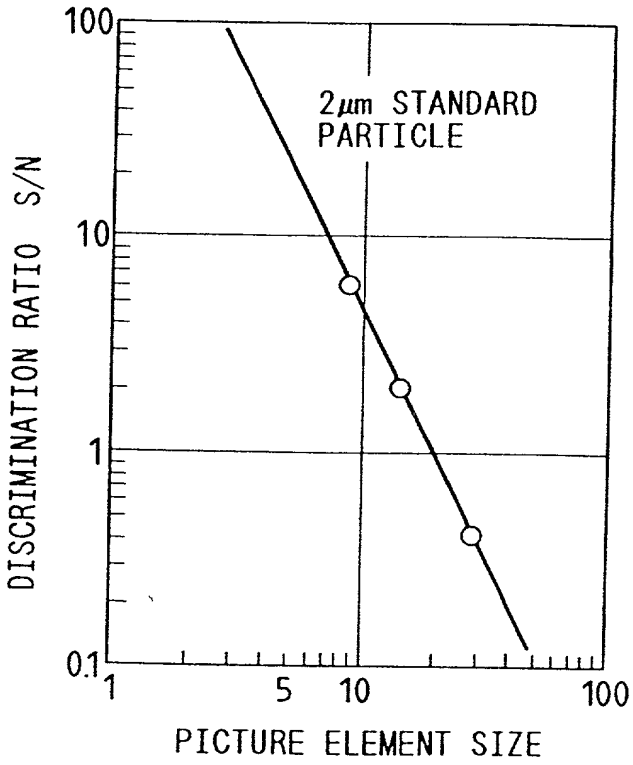

100
10
1
0.1
1
5
10
100
2μm STANDARD PARTICLE
DISCRIMINATION RATIO S/N
PICTURE ELEMENT SIZE

FIG. 6

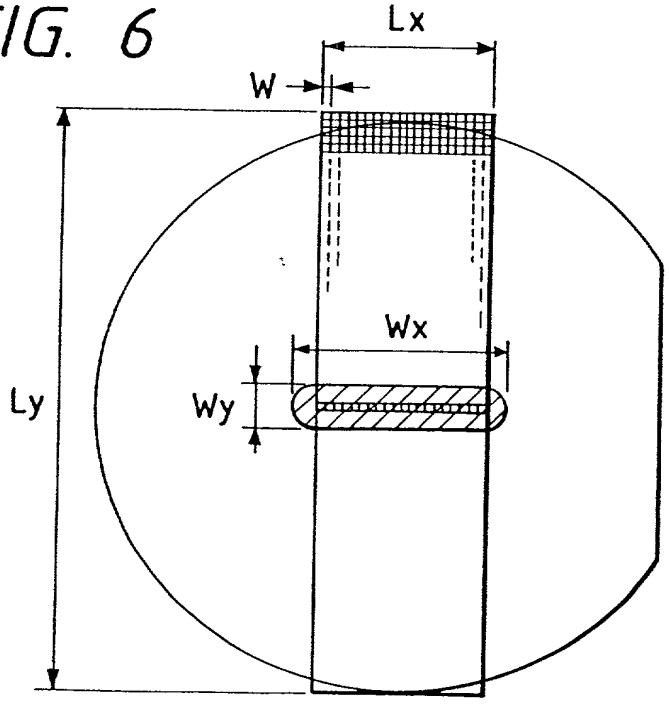

Lx
W
Wx
Wy
Ly

FIG. 7(a)

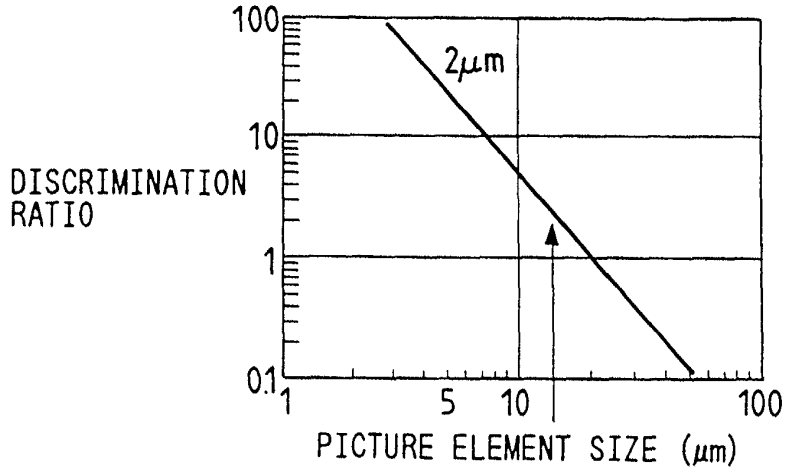


FIG. 7(b)

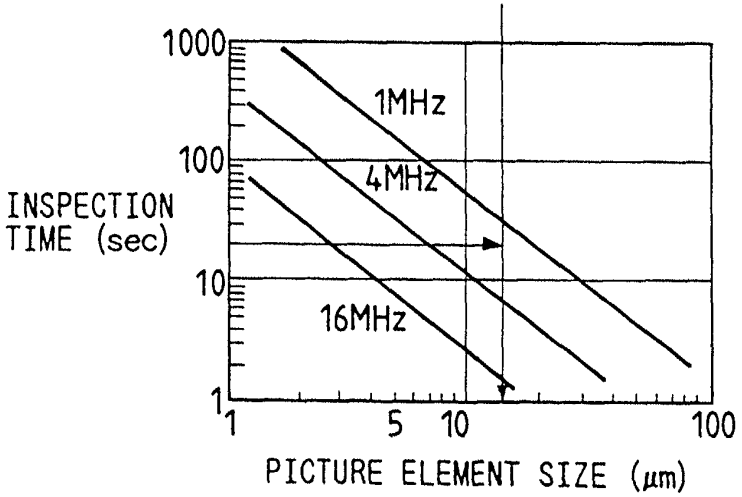


FIG. 7(c)

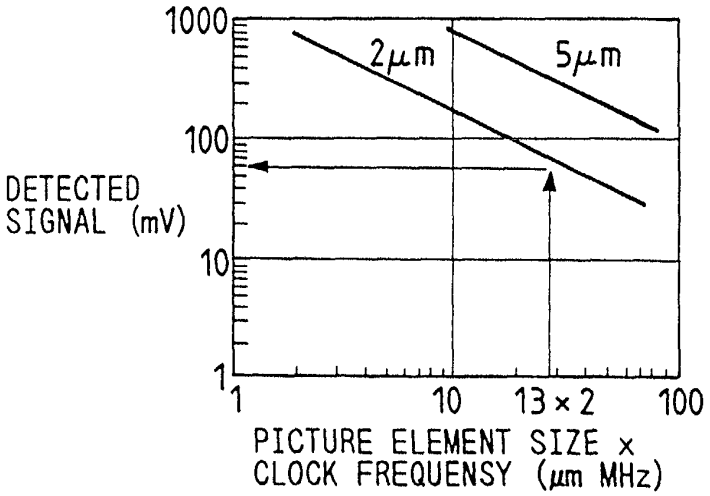


FIG. 8

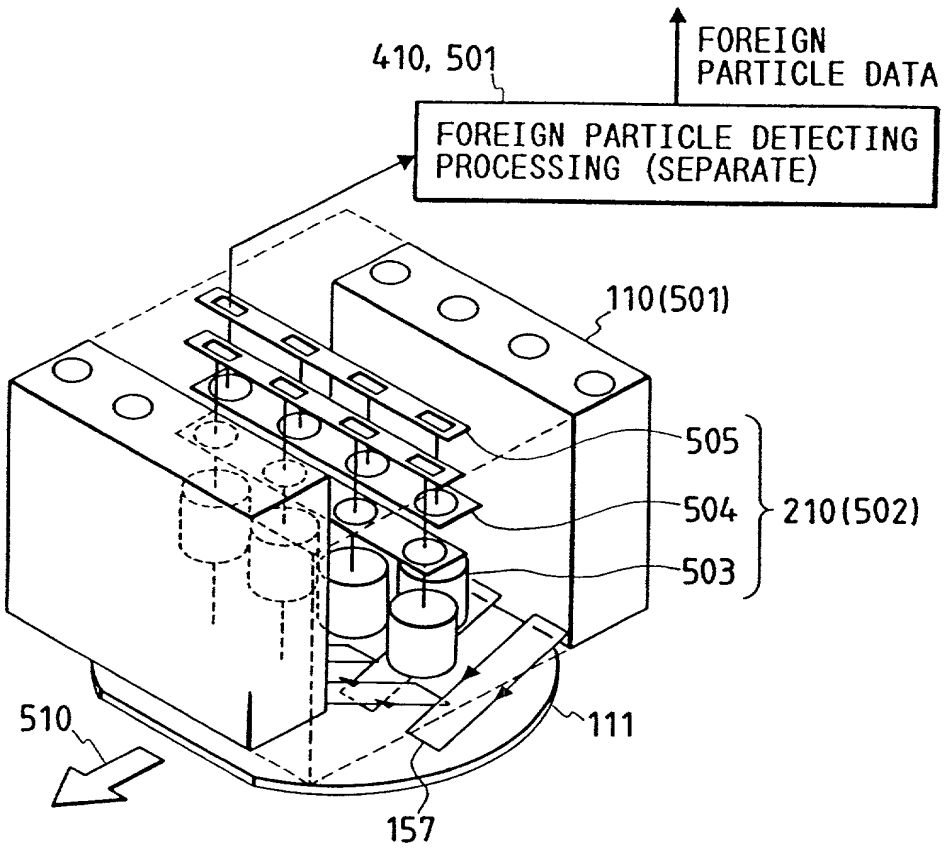

410, 501
FOREIGN PARTICLE DATA
FOREIGN PARTICLE DETECTING PROCESSING (SEPARATE)
110(501)
505
504
503
210(502)
510
111
157

FIG. 9(a)

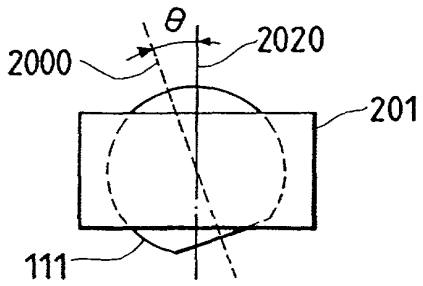

θ
2000
2020
201
111

FIG. 9(b)

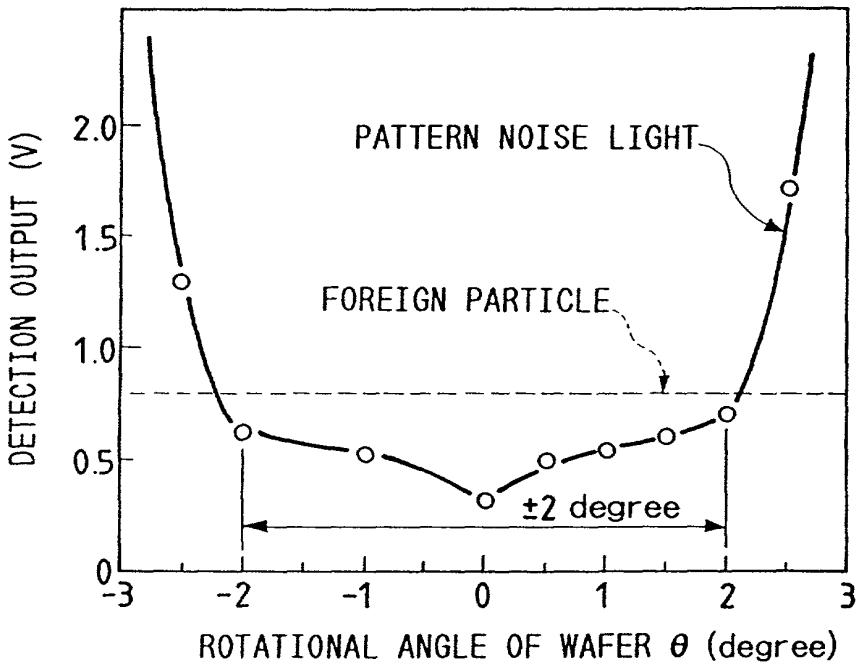

DETECTION OUTPUT (V)
2.0
1.5
1.0
0.5
0
PATTERN NOISE LIGHT
FOREIGN PARTICLE
±2 degree
-3
-2
-1
0
1
2
3
ROTATIONAL ANGLE OF WAFER θ (degree)

FIG. 10(a)

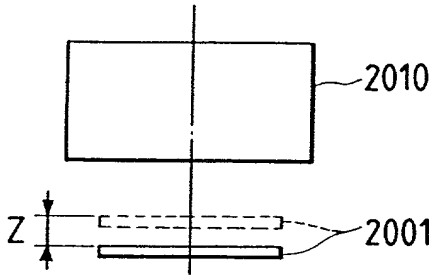


FIG. 10(b)

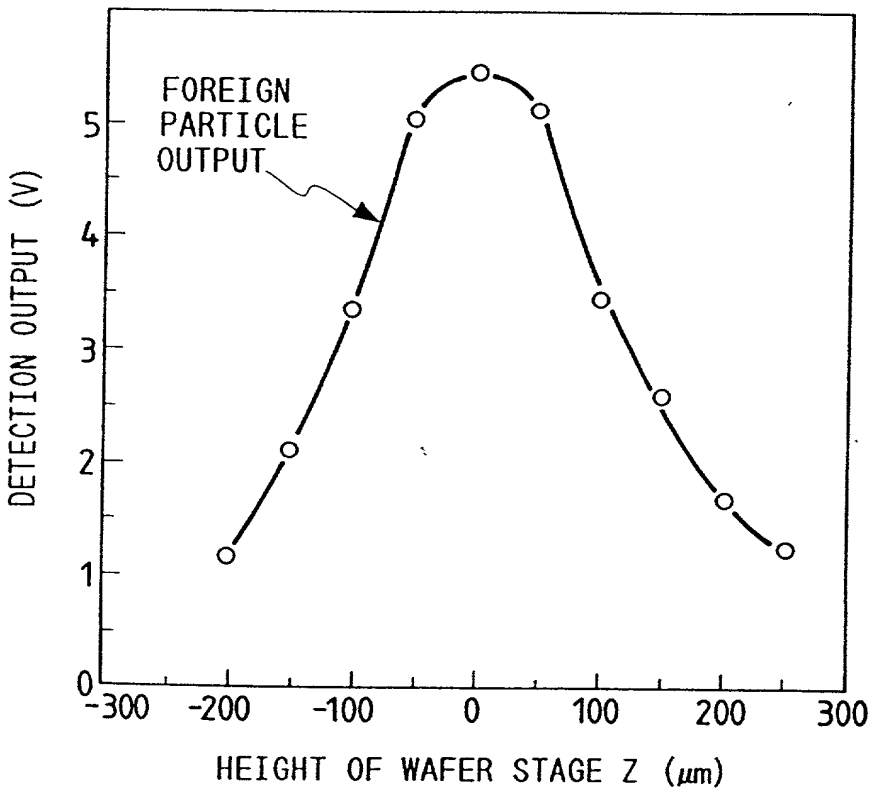


FIG. 11(a)

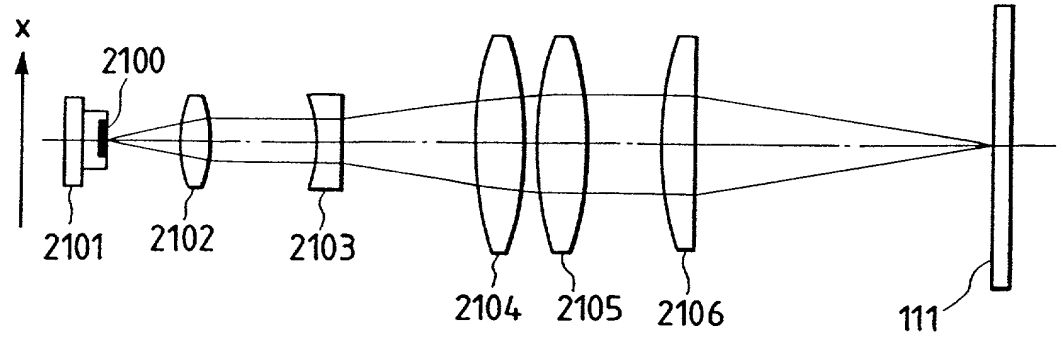


FIG. 11(b)

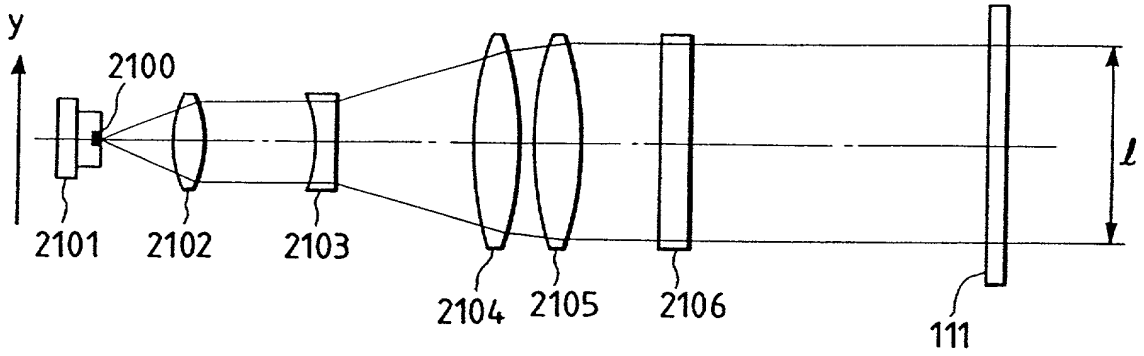


FIG. 12(a)

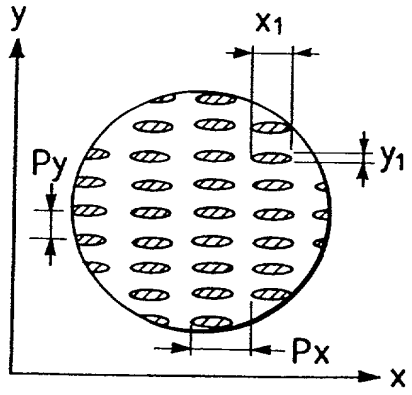


FIG. 12(b)

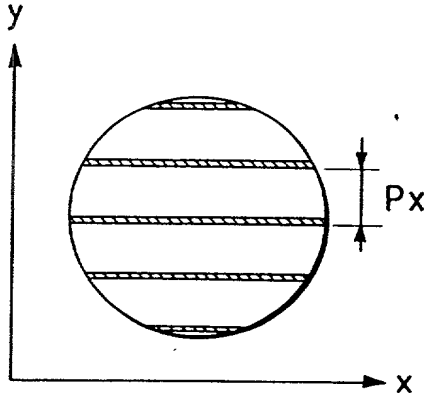


FIG. 13(a)

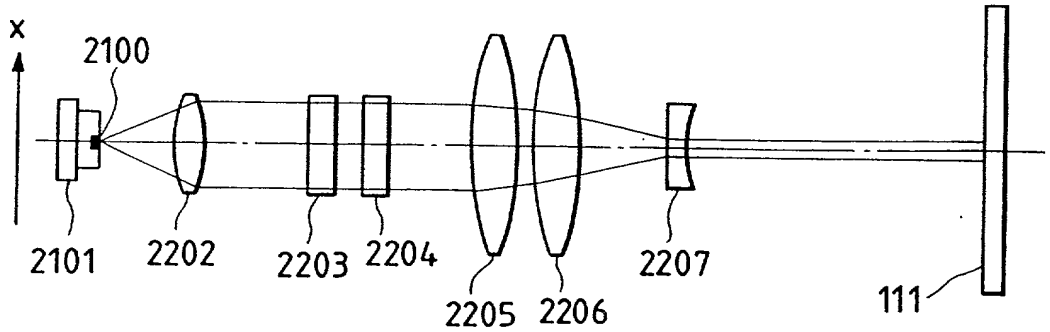


FIG. 13(b)

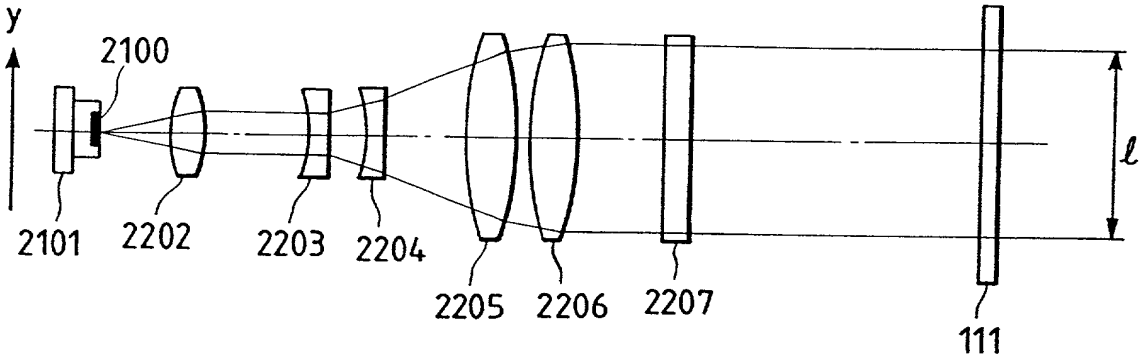


FIG. 14

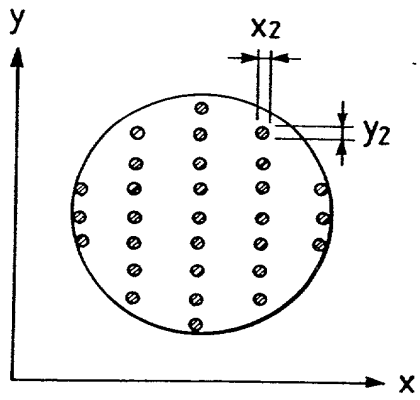


FIG. 15

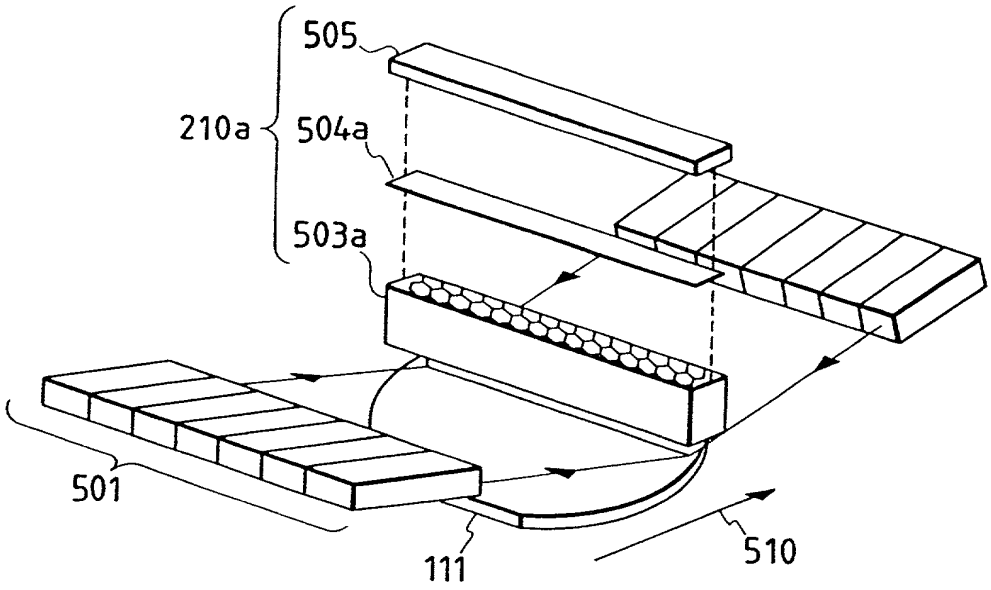

505
210a
504a
503a
501
111
510

FIG. 16

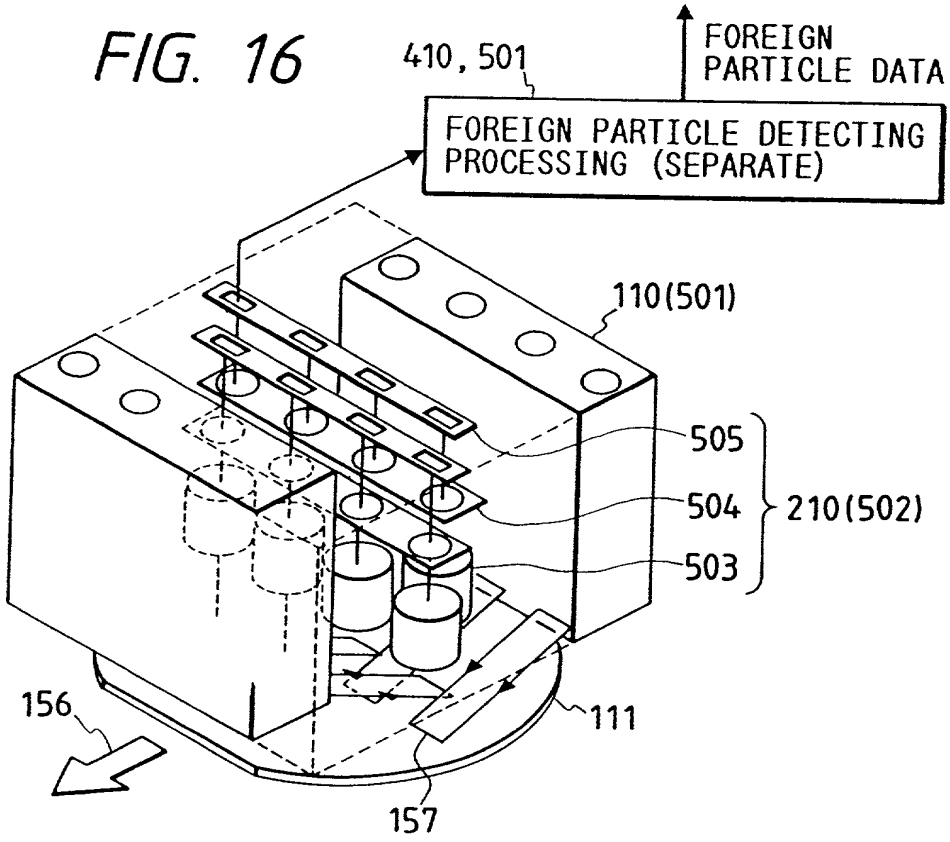

410, 501
FOREIGN PARTICLE DATA
FOREIGN PARTICLE DETECTING PROCESSING (SEPARATE)
110(501)
505
504
503
210(502)
156
111
157

FIG. 17(a)

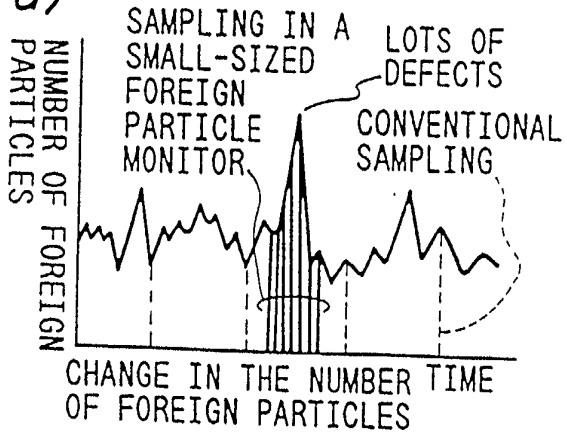


FIG. 17(b)

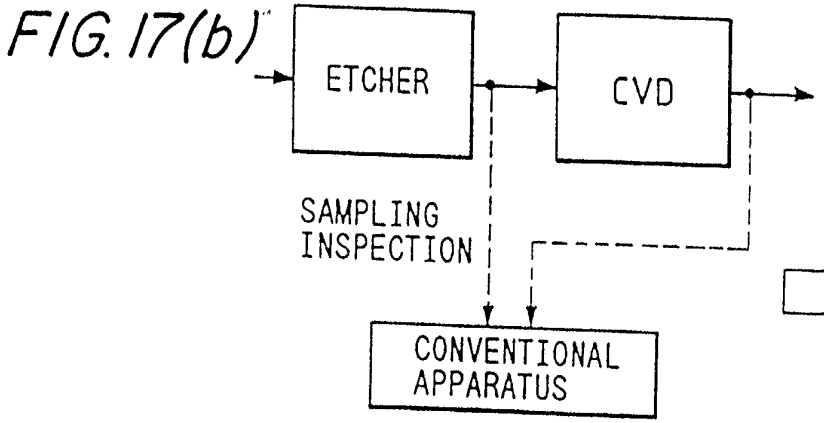


FIG. 17(c)

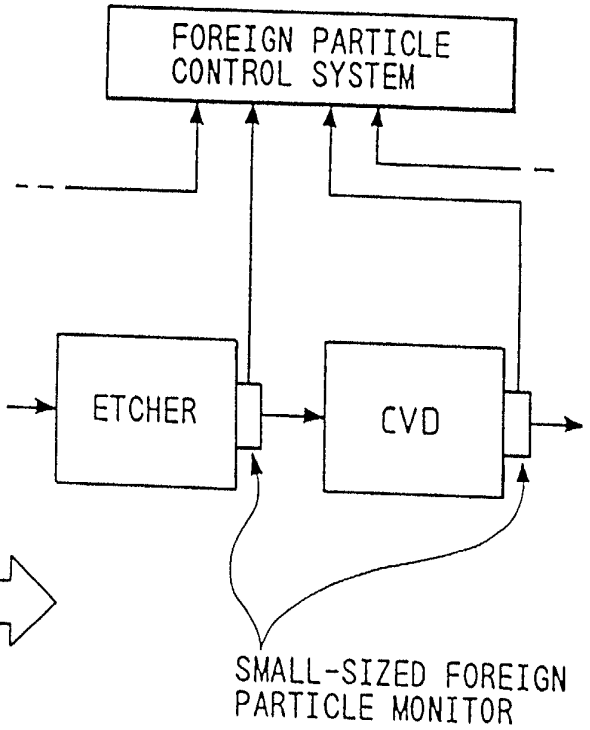


FIG. 18

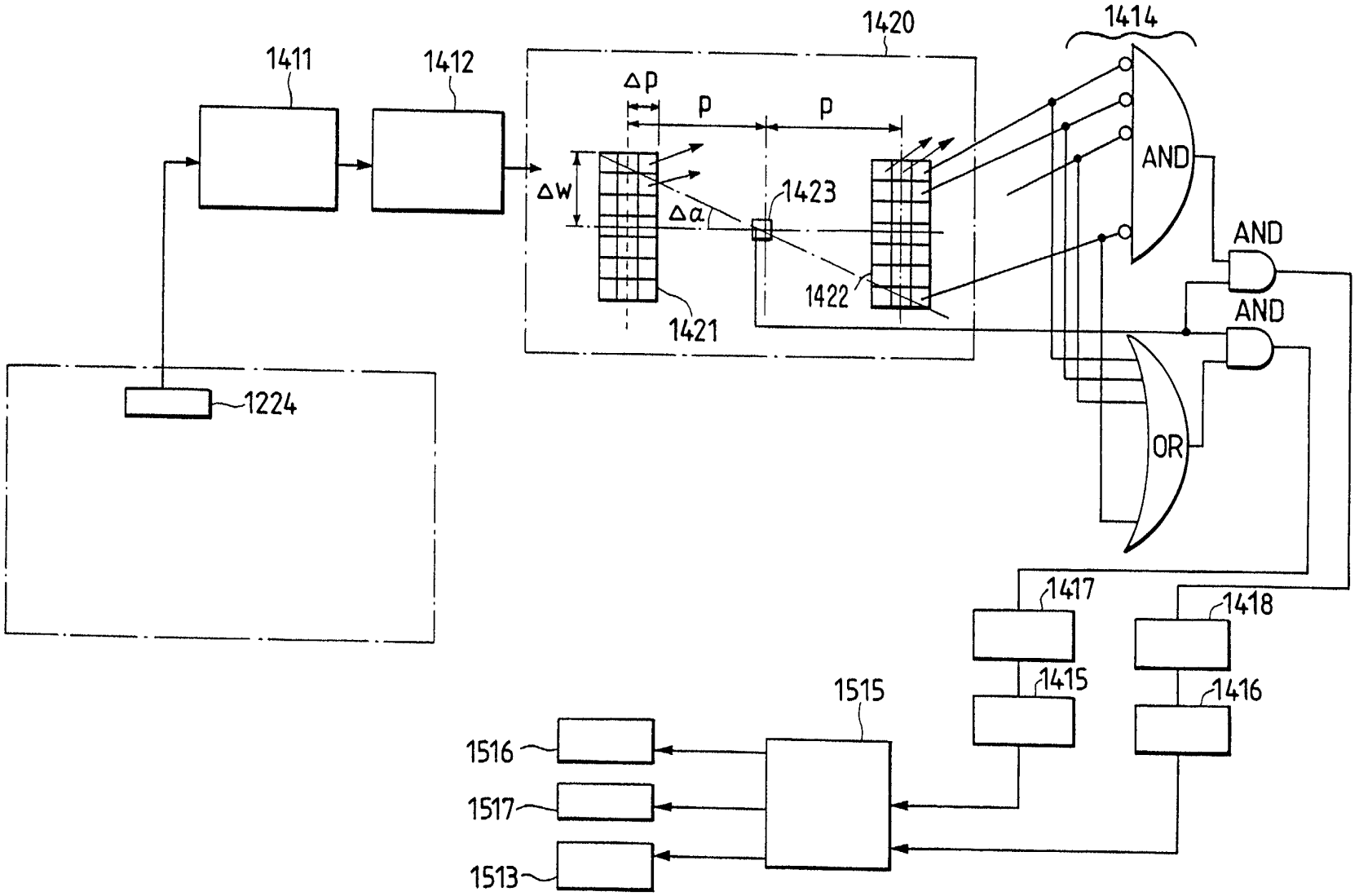

1420
1414
1411
1412
Δp
p
p
Δw
Δα
1423
AND
AND
AND
1422
1421
1224
OR
1417
1418
1415
1416
1515
1516
1517
1513

FIG. 19

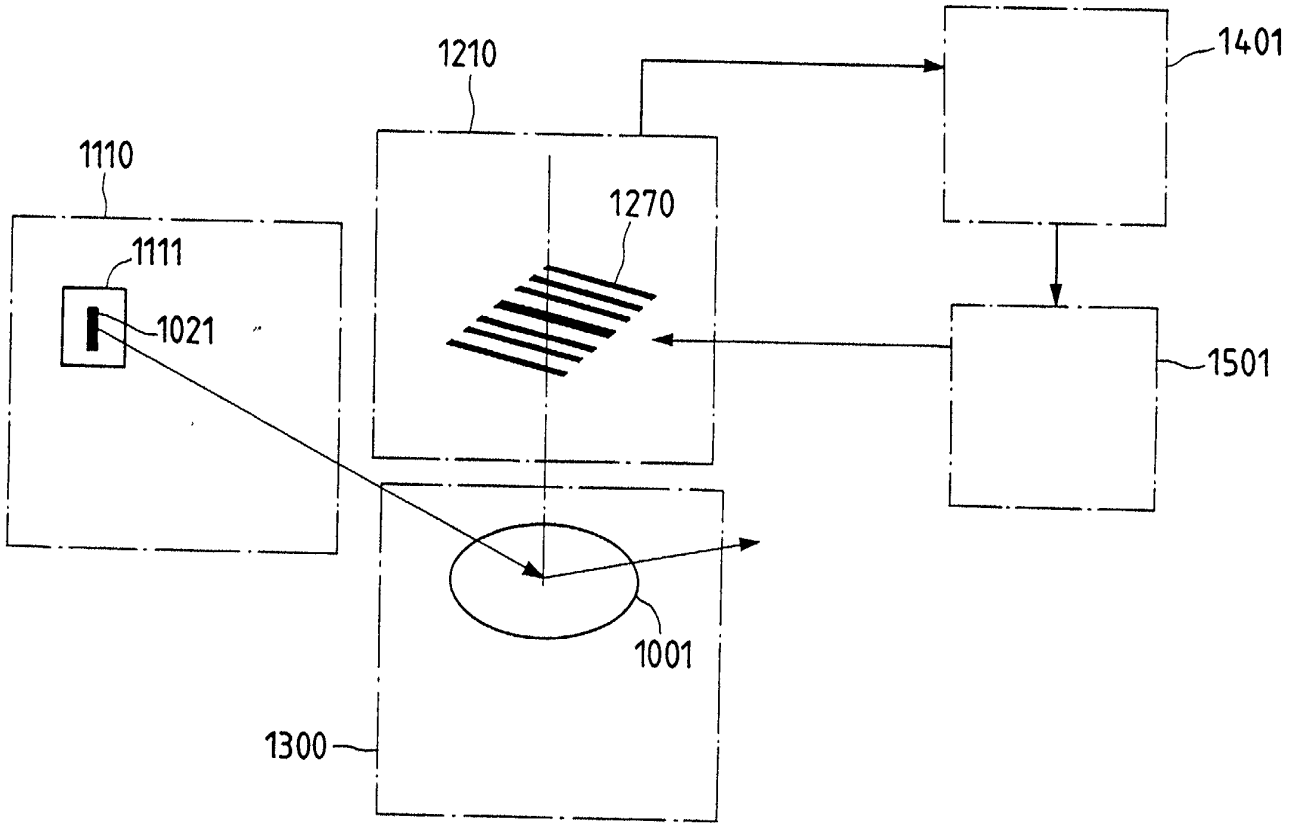


FIG. 20

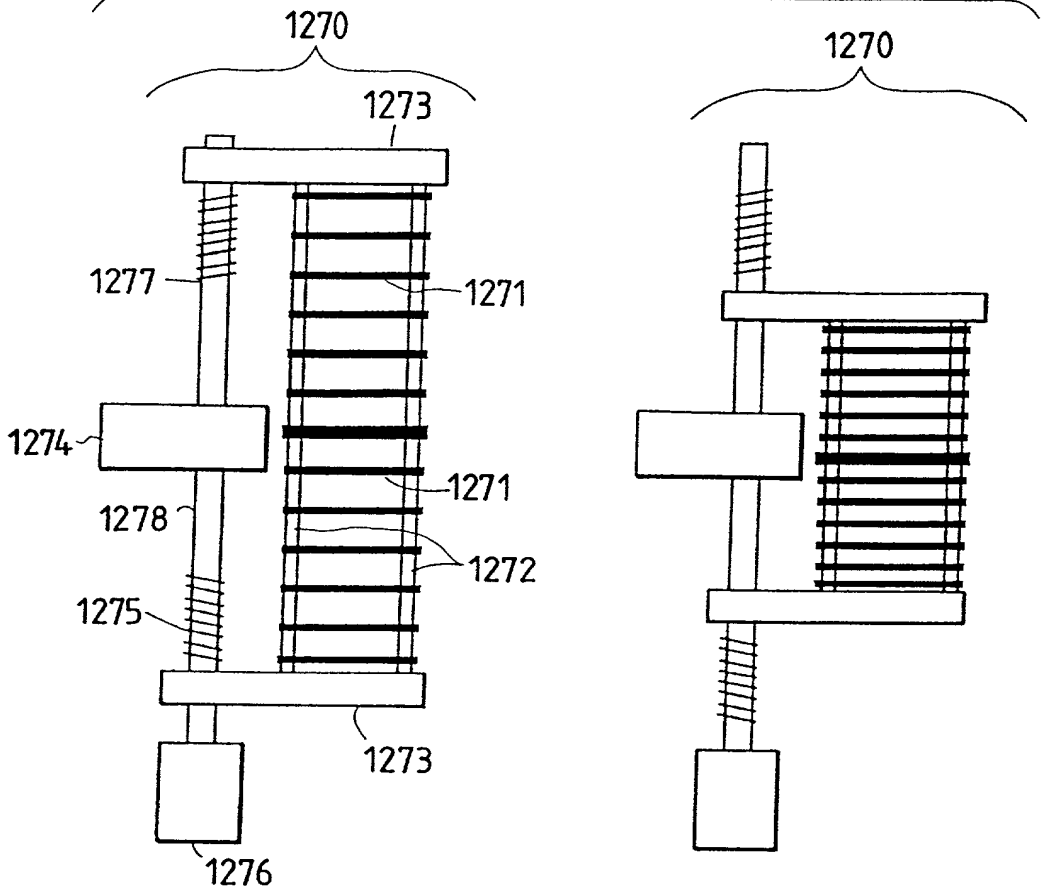

1270
1273
1277
1271
1274
1271
1278
1272
1275
1273
1276
1270

FIG. 21

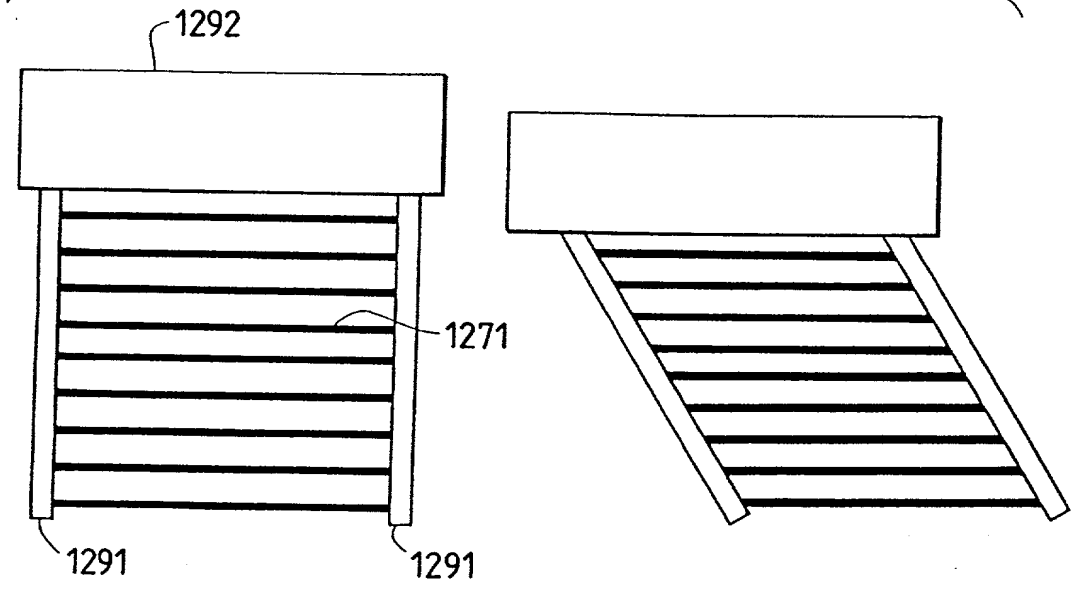

1292
1271
1291
1291

FIG. 22

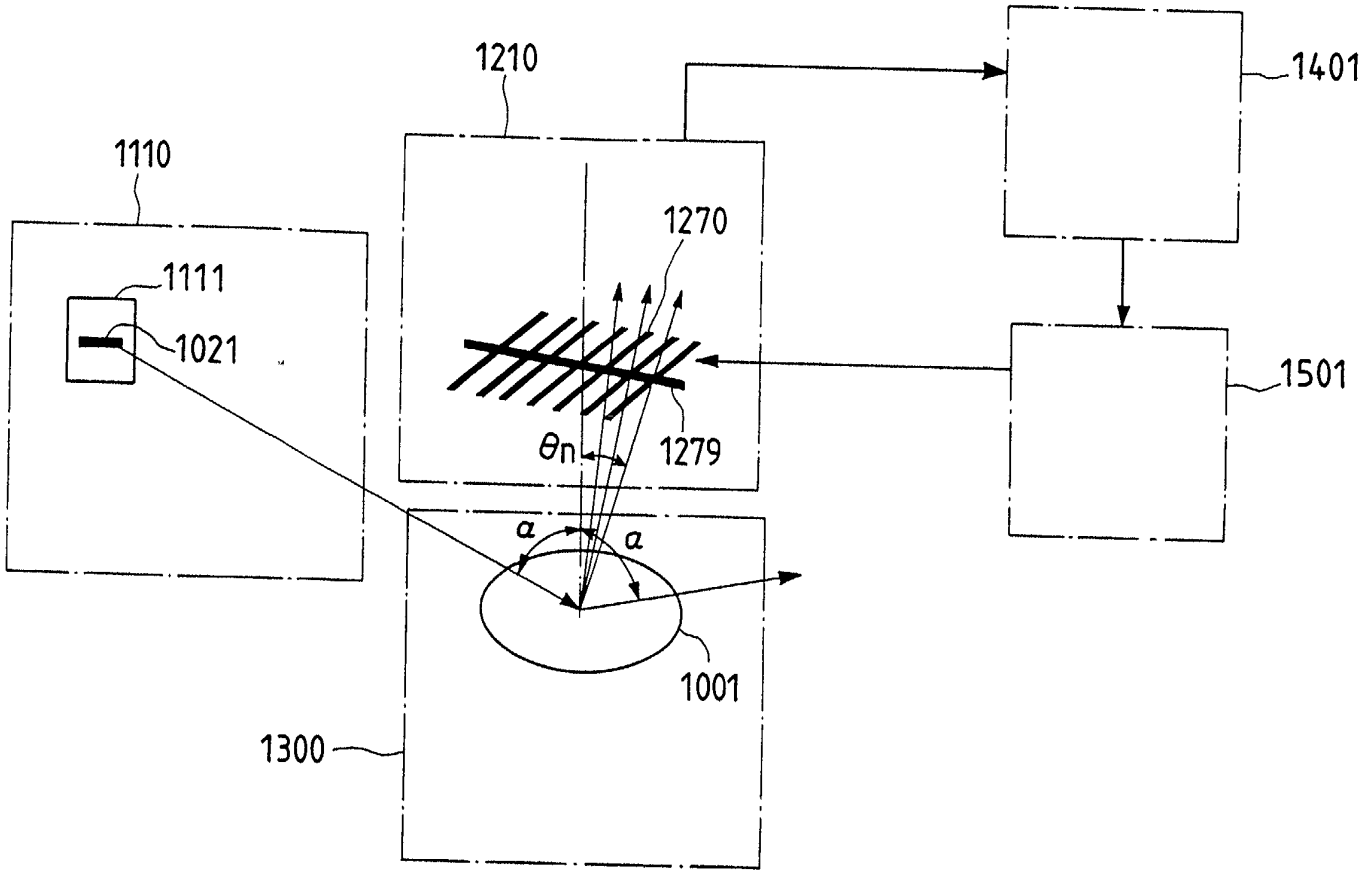


FIG. 23

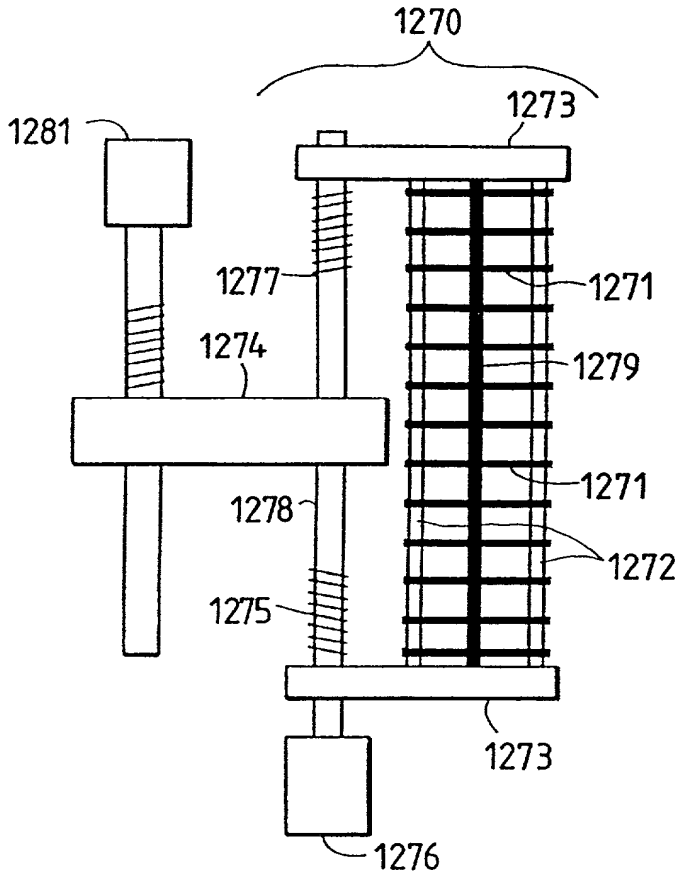

1270
1273
1281
1277
1271
1274
1279
1271
1278
1272
1275
1273
1276

FIG. 26

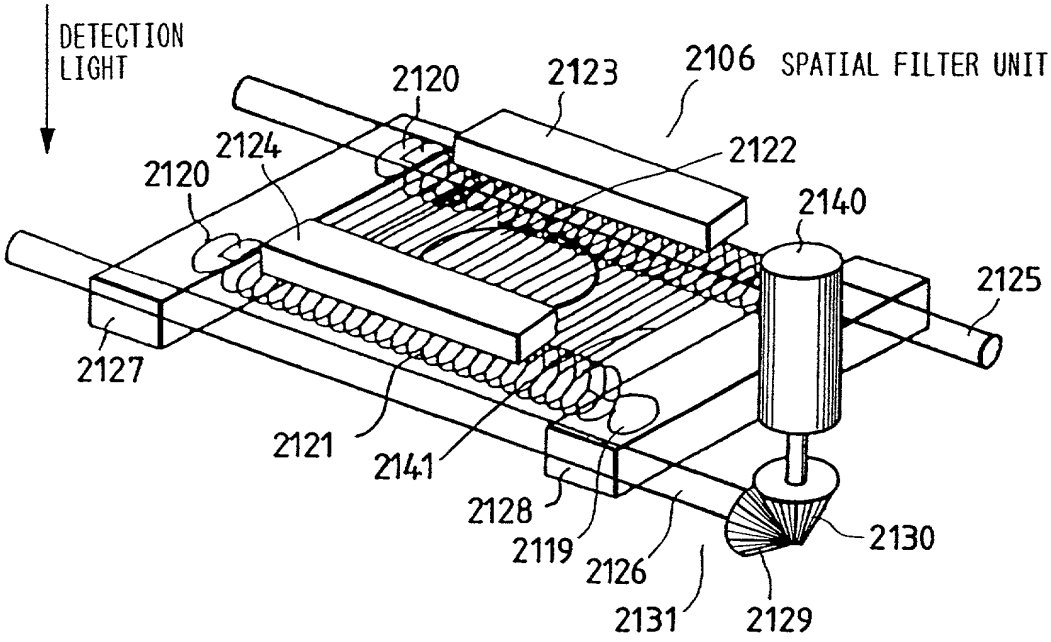

DETECTION LIGHT
2120
2123
2106
SPATIAL FILTER UNIT
2124
2122
2120
2140
2125
2127
2121
2141
2128
2119
2126
2130
2131
2129

FIG. 24

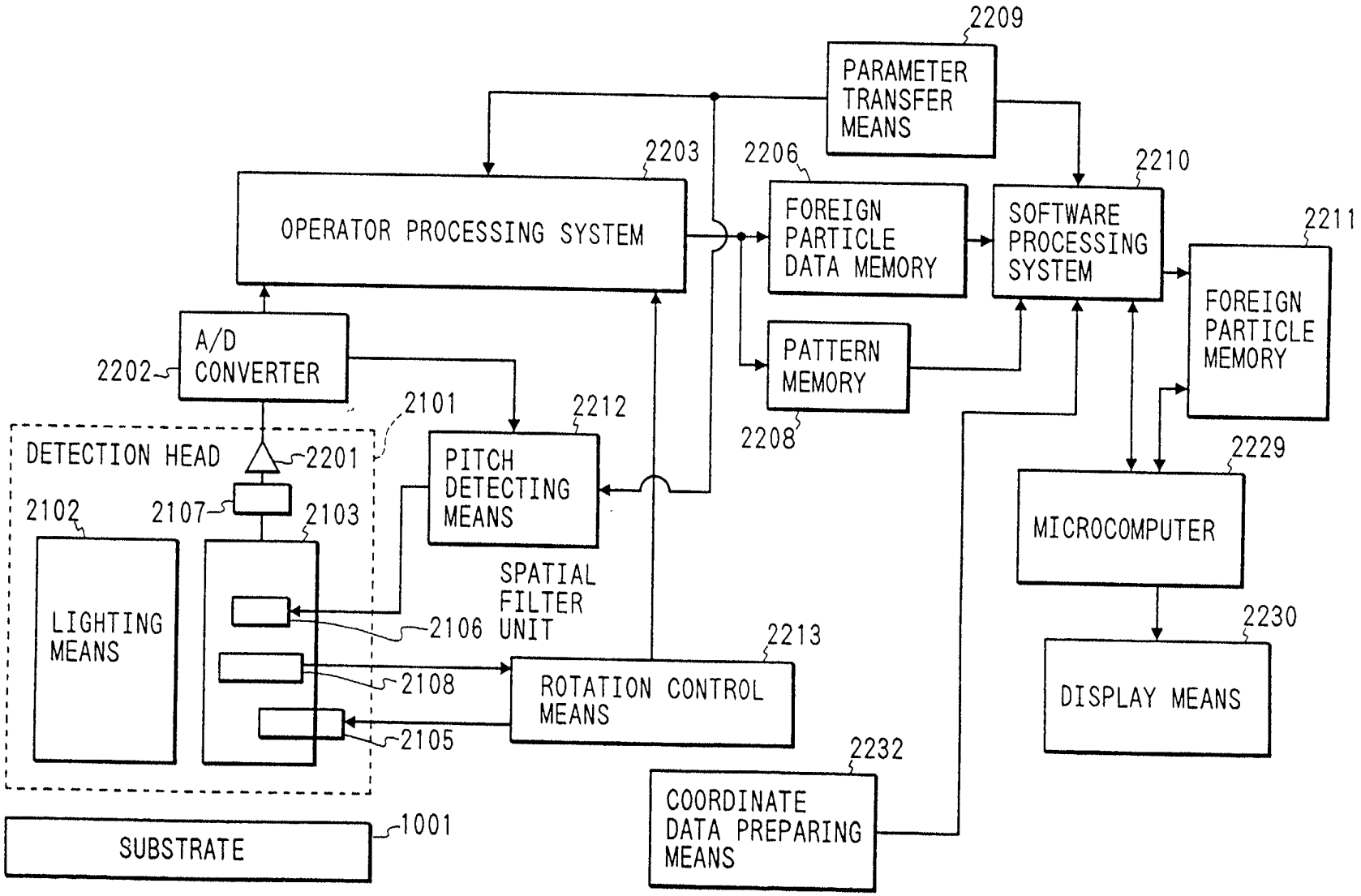

2209
PARAMETER TRANSFER MEANS
2203
OPERATOR PROCESSING SYSTEM
2206
FOREIGN PARTICLE DATA MEMORY
2210
SOFTWARE PROCESSING SYSTEM
2211
FOREIGN PARTICLE MEMORY
2202
A/D CONVERTER
PATTERN MEMORY
2208
2101
2212
DETECTION HEAD
2201
PITCH DETECTING MEANS
2229
MICROCOMPUTER
2102
2107
2103
SPATIAL FILTER UNIT
LIGHTING MEANS
2106
2230
2213
2108
ROTATION CONTROL MEANS
DISPLAY MEANS
2105
2232
COORDINATE DATA PREPARING MEANS
SUBSTRATE
1001

FIG. 25(a)

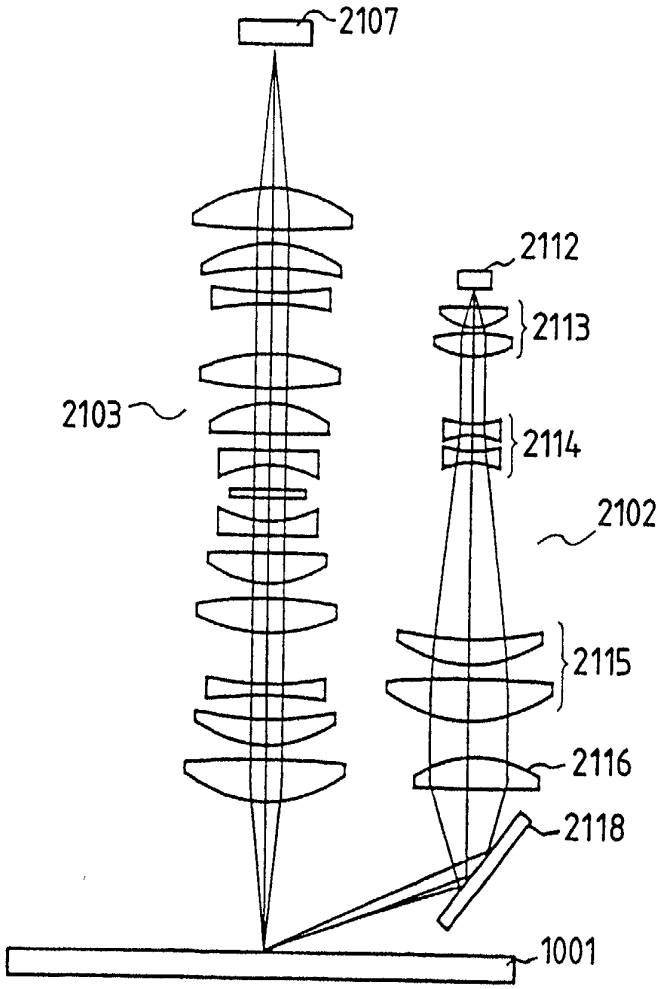


FIG. 25(b)

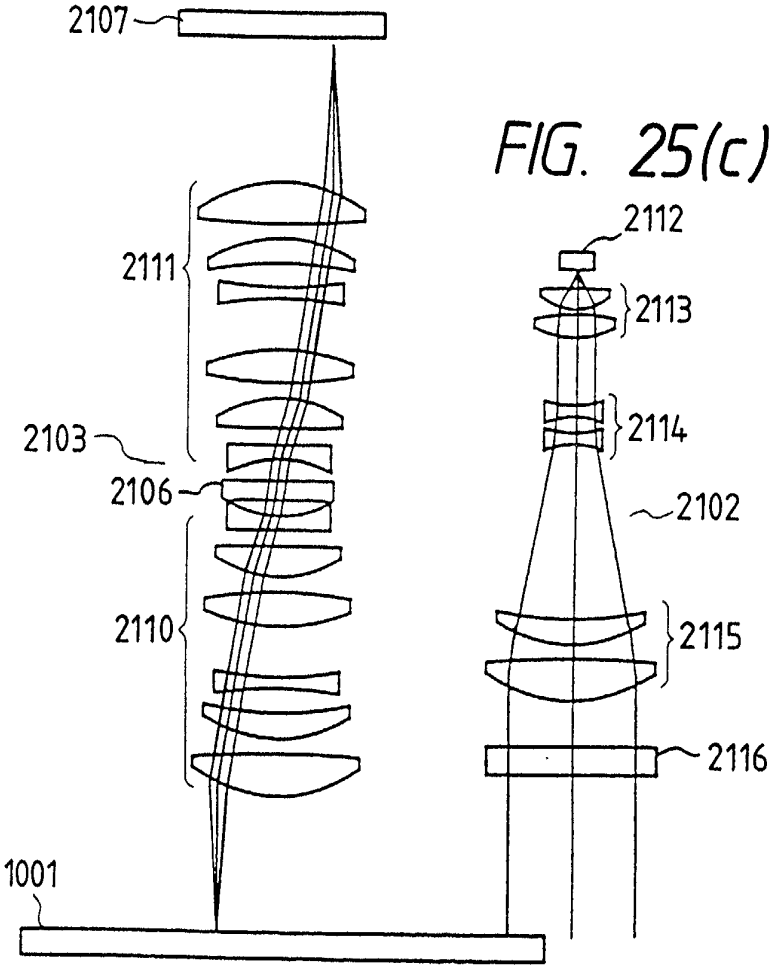


FIG. 25(c)

FIG. 27

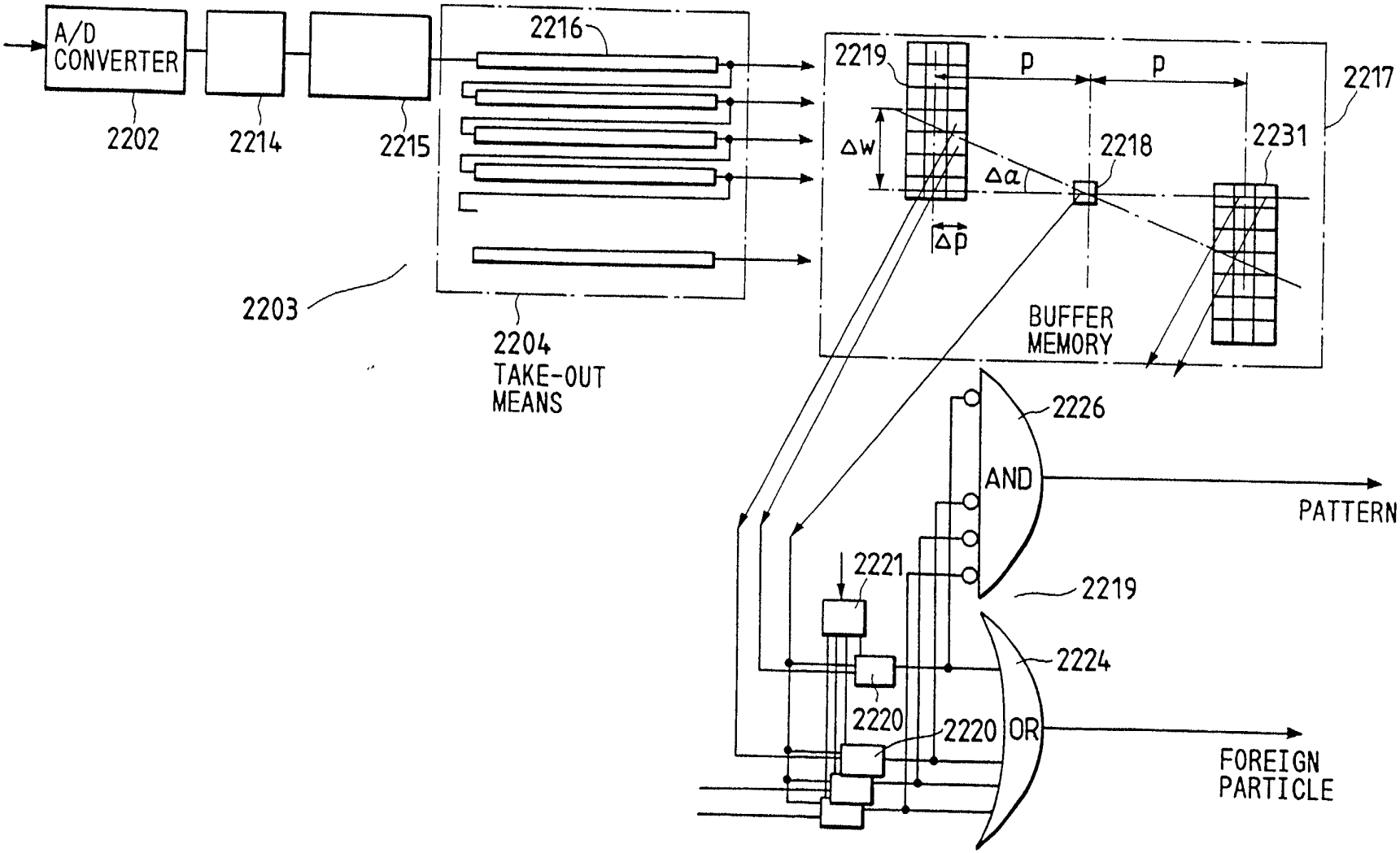

A/D CONVERTER
2202
2214
2215
2216
2203
2204
TAKE-OUT MEANS
2219
P
P
2217
Δw
2218
2231
Δα
Δp
BUFFER MEMORY
2226
AND
PATTERN
2221
2219
2224
2220
2220
OR
FOREIGN PARTICLE

FIG. 28

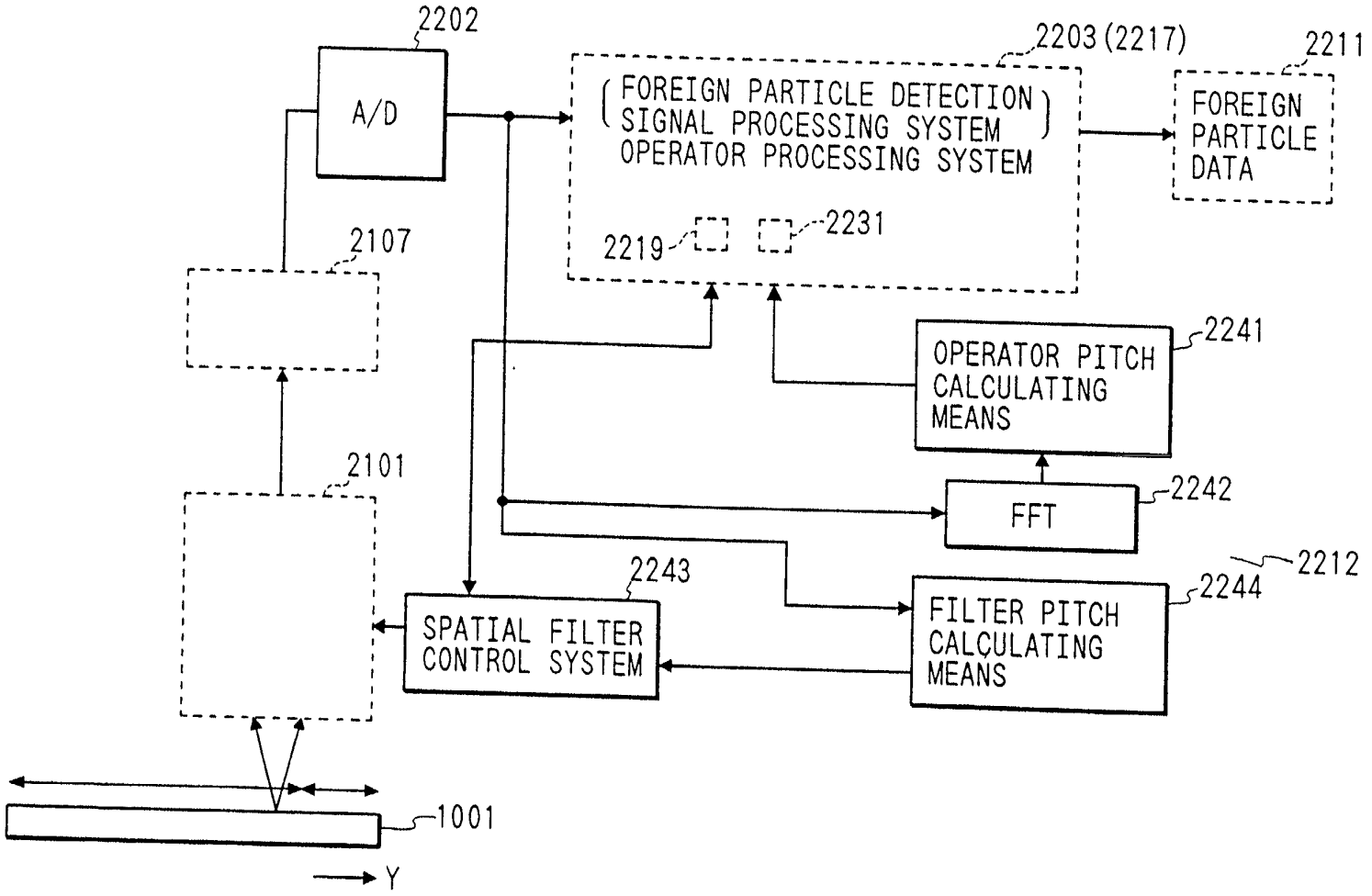

2202
A/D
2203 (2217)
(FOREIGN PARTICLE DETECTION SIGNAL PROCESSING SYSTEM OPERATOR PROCESSING SYSTEM)
2211
FOREIGN PARTICLE DATA
2219
2231
2107
2241
OPERATOR PITCH CALCULATING MEANS
2101
2242
FFT
2243
2212
2244
SPATIAL FILTER CONTROL SYSTEM
FILTER PITCH CALCULATING MEANS
1001
Y

FIG. 29(a) PRIOR ART

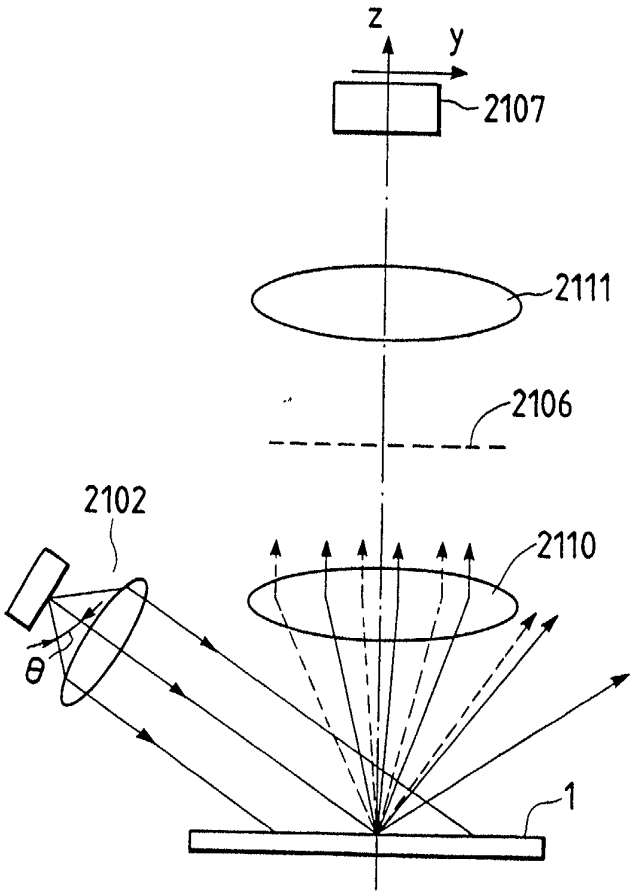


FIG. 29(b) PRIOR ART

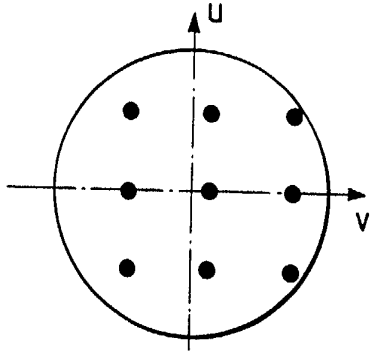


FIG. 29(c) PRIOR ART

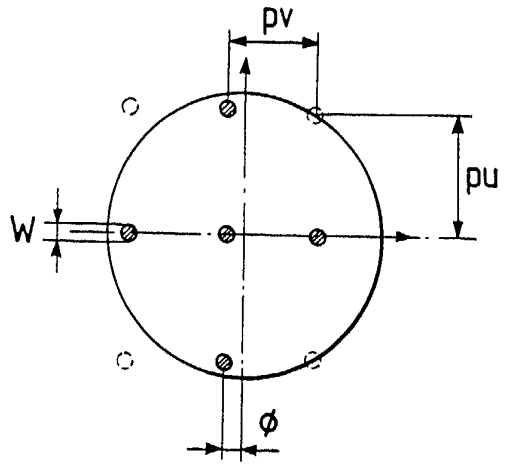


FIG. 30(a)

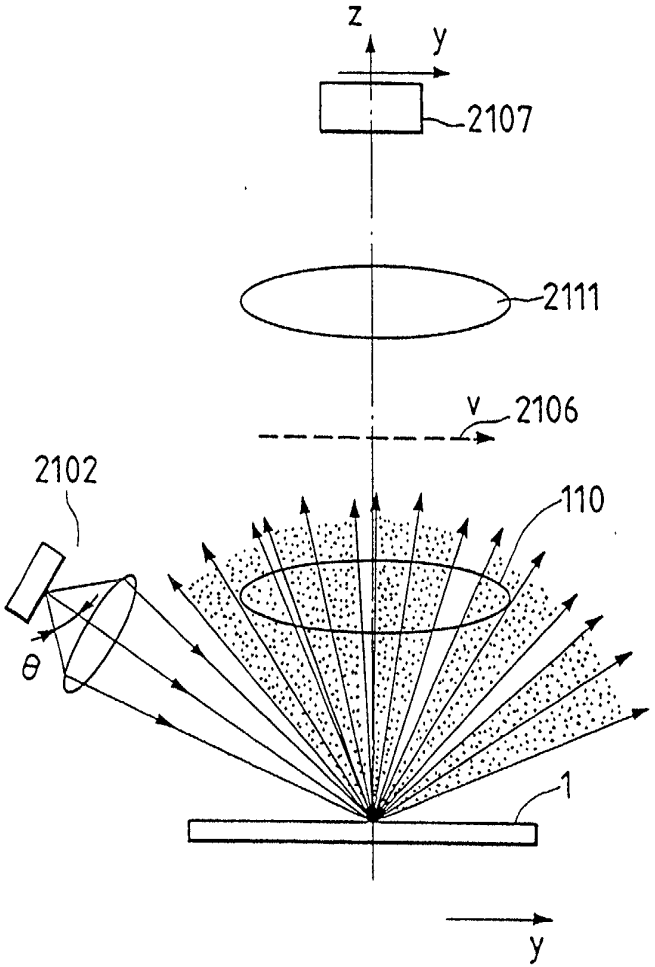


FIG. 30(d)

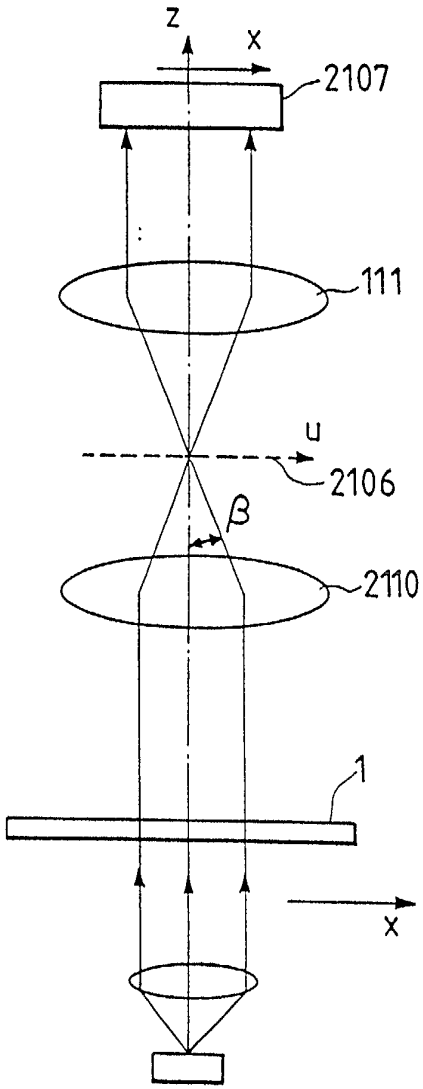


FIG. 30(b)

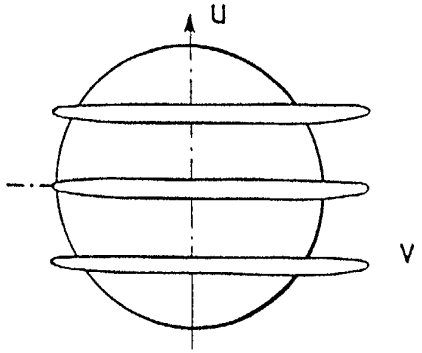


FIG. 30(c)

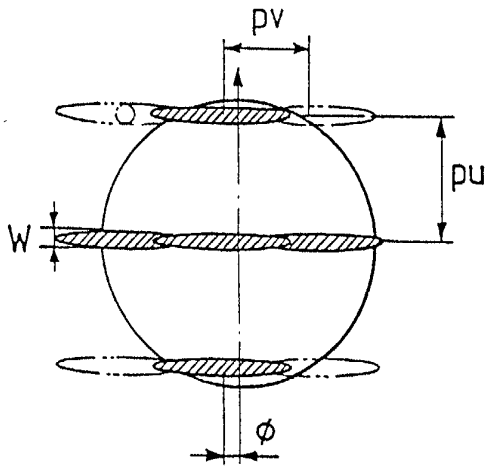


FIG. 31(a)

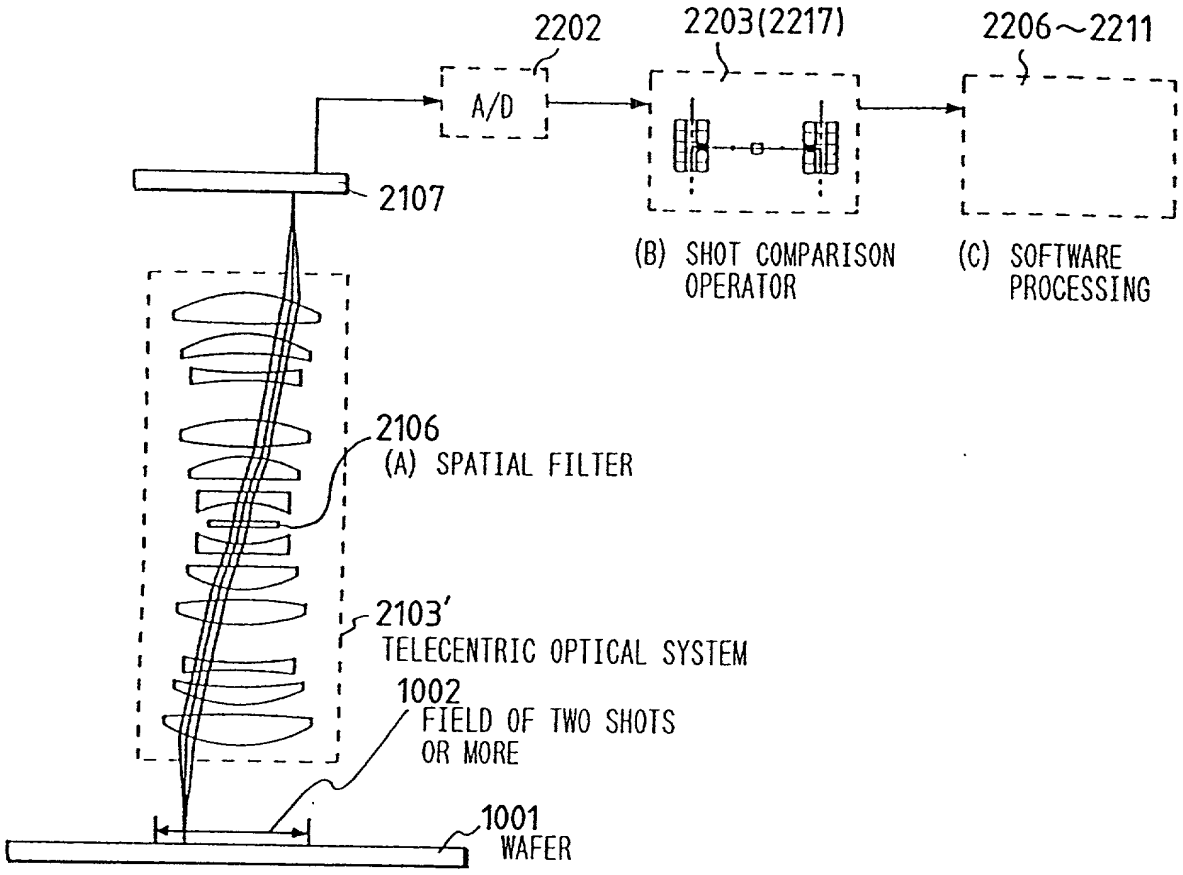
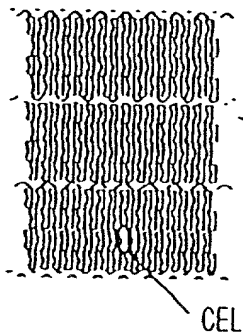


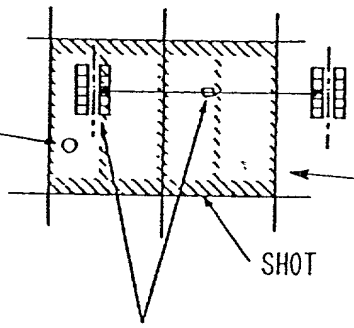
FIG. 31(b)(1)



(1) ERASING OF PATTERN USING SPATIAL FILTER

ERASE THE REPEATABILITY OF CELL USING SPATIAL FILTER

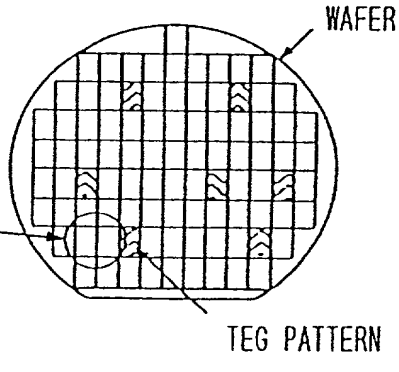
FIG. 31(b)(2)



(2) ERASING OF PATTERN USING SHOT COMPARISON OPERATOR

ERASE USING THE REPEATABILITY OF TWO SHOTS

FIG. 31(b)(3)



(3) ERASING OF TEG PATTERN USING SOFTWARE

ERASE USING COORDINATE-MATRIX DATA

FIG. 32

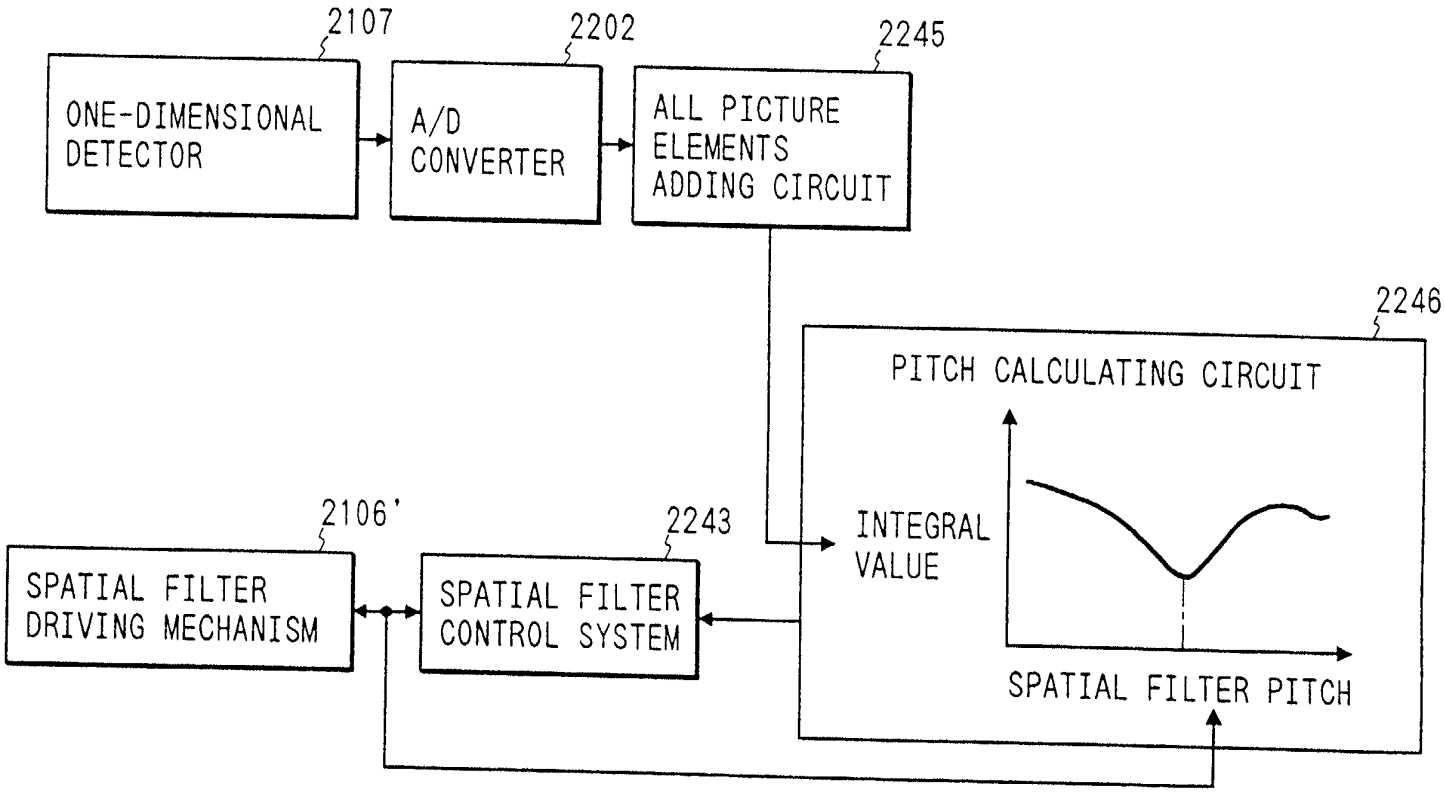

2107
2202
2245
ONE-DIMENSIONAL DETECTOR
A/D CONVERTER
ALL PICTURE ELEMENTS ADDING CIRCUIT
2246
PITCH CALCULATING CIRCUIT
INTEGRAL VALUE
SPATIAL FILTER PITCH
2106'
2243
SPATIAL FILTER DRIVING MECHANISM
SPATIAL FILTER CONTROL SYSTEM

FIG. 33(a)

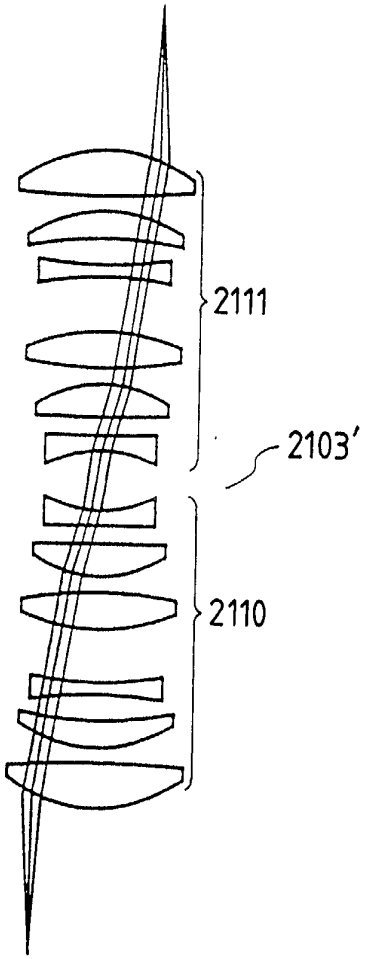


FIG. 33(b)

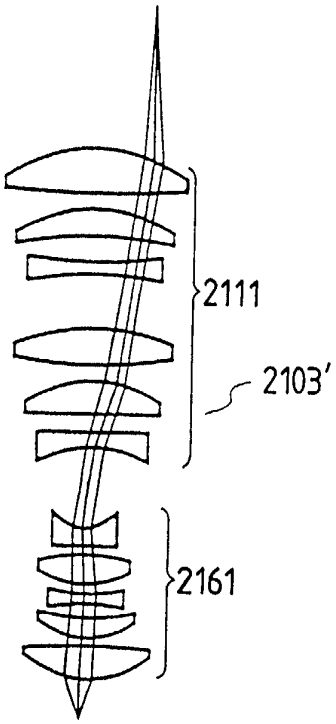


FIG. 34(a)

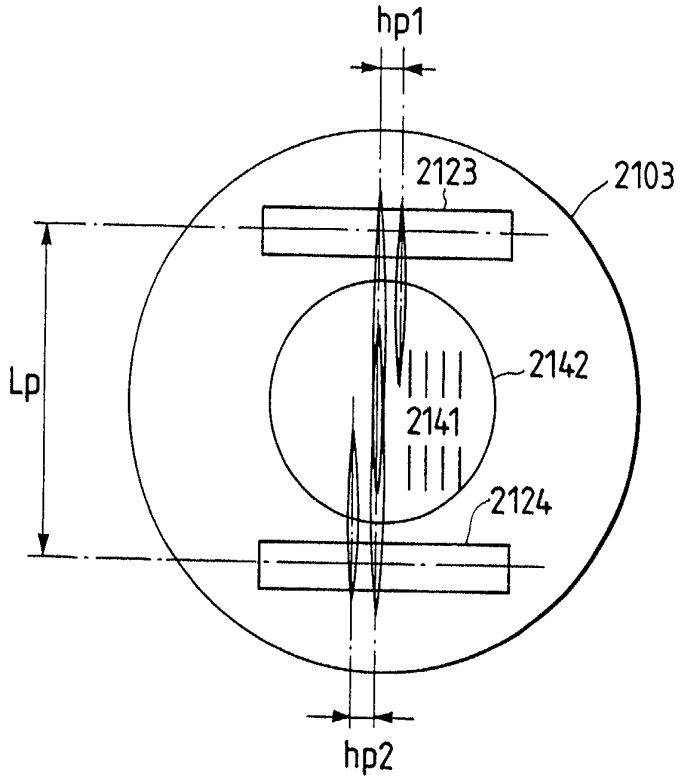


FIG. 34(b)

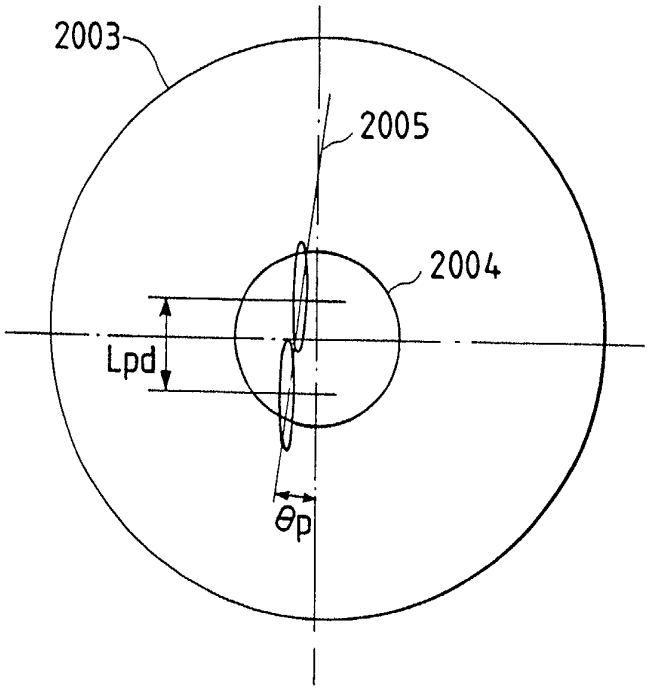


FIG. 35

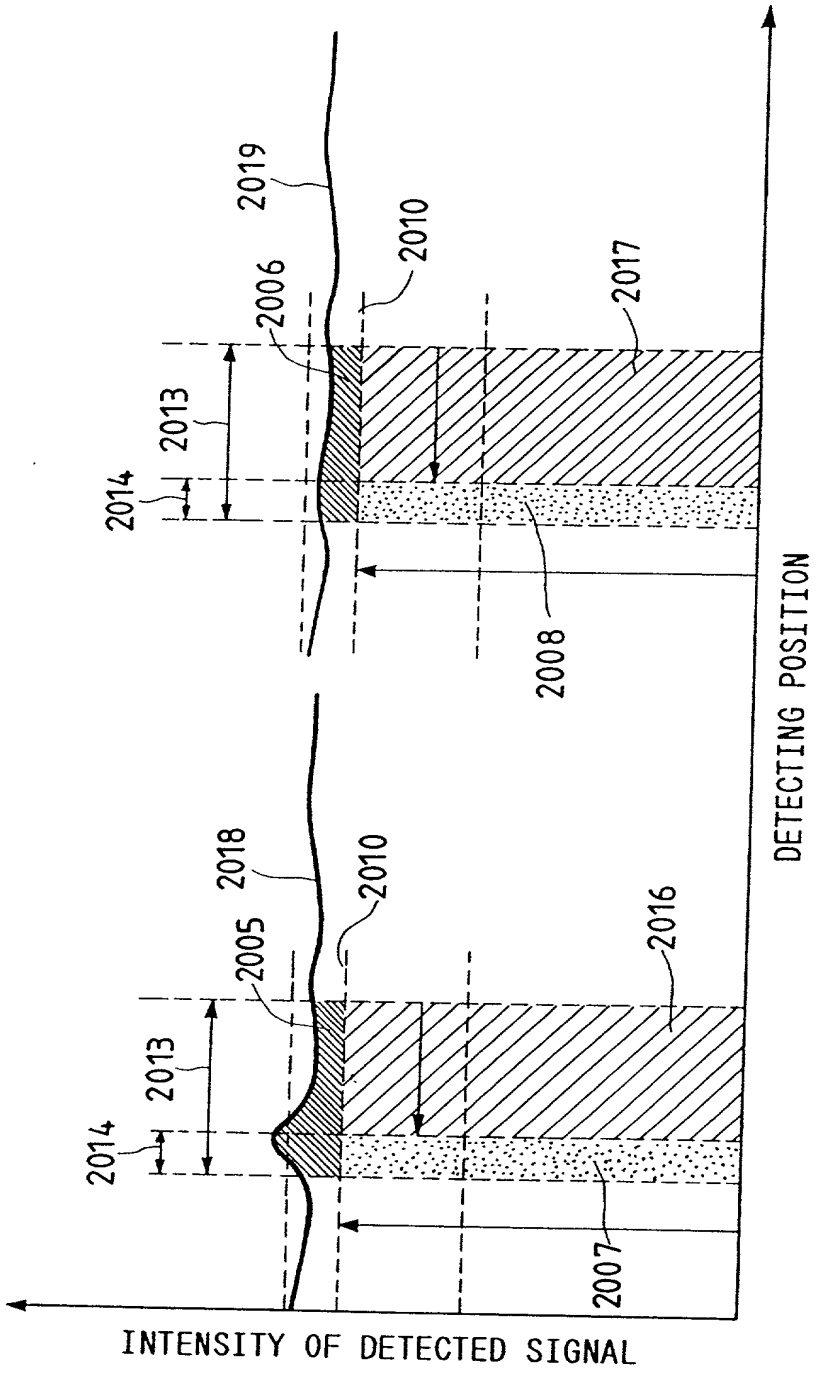

2019
2010
2006
2017
2013
2014
2008
2018
2010
2005
2016
2013
2014
2007
INTENSITY OF DETECTED SIGNAL
DETECTING POSITION

FIG. 36

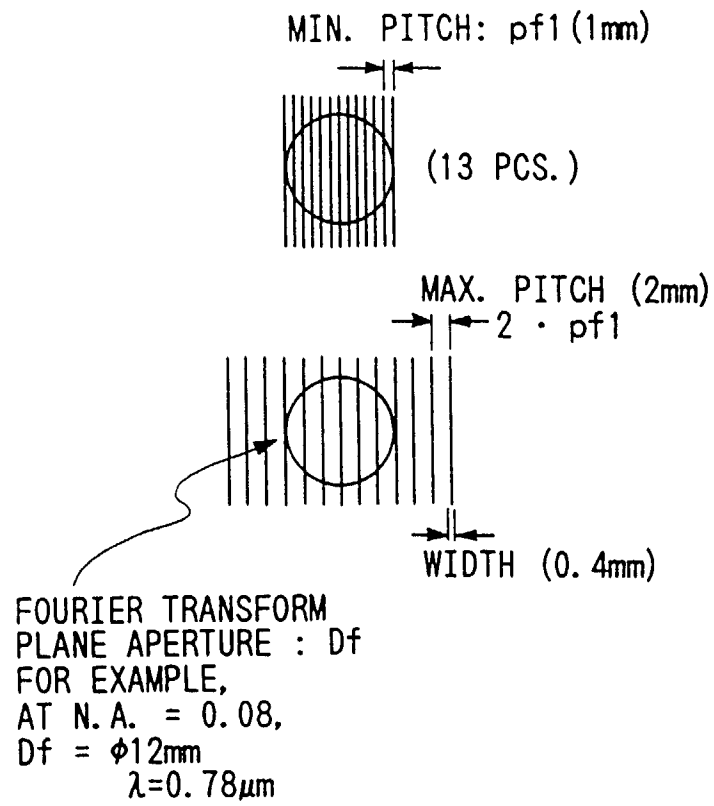
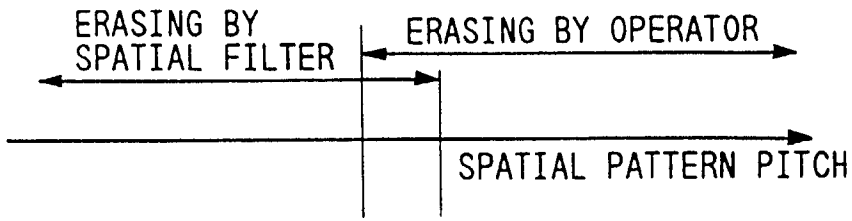


FIG. 37



pf1(mm)	L1(μm)
0.6	100
0.8	75
1.0	60
1.2	50

EASY TO MANUFACTURE

HIGH RATE OF DETECTION AREA

FIG. 38

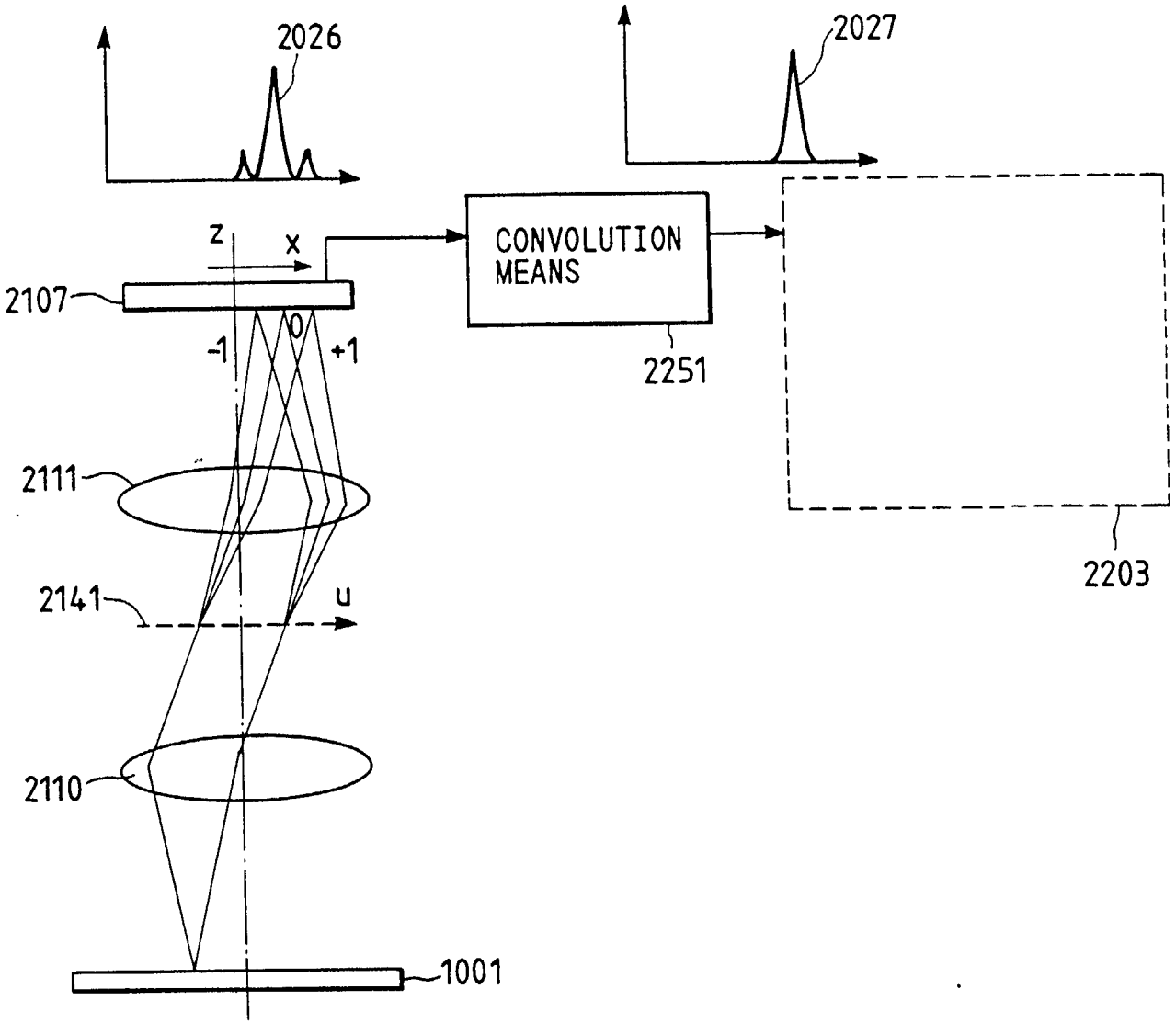


FIG. 39A

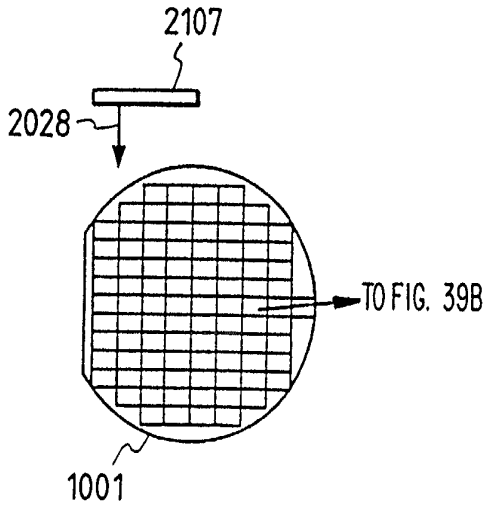


FIG. 39B

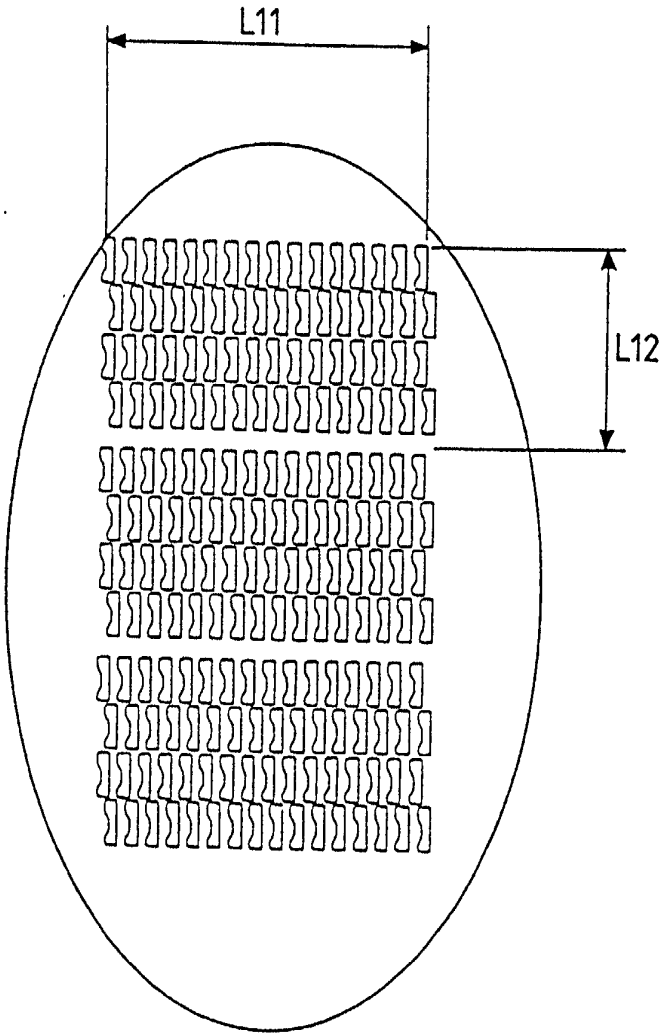


FIG. 40

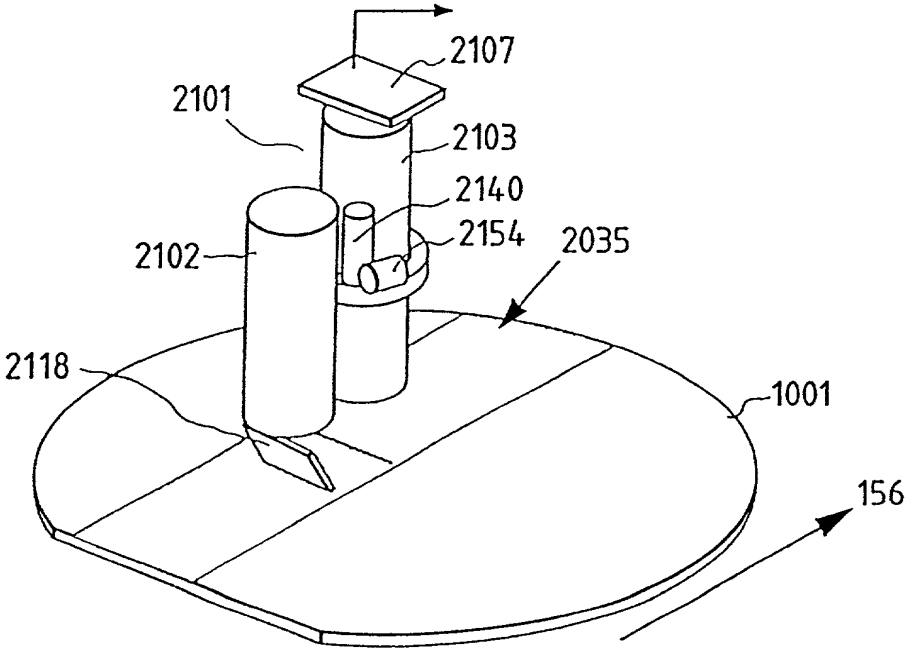

2107
2101
2103
2140
2154
2035
2102
2118
1001
156

FIG. 41

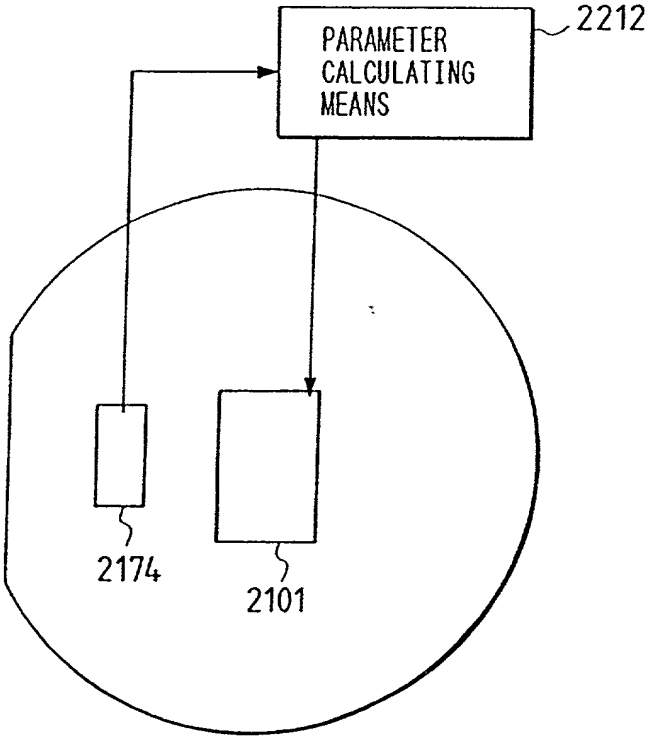

PARAMETER CALCULATING MEANS
2212
2174
2101

FIG. 42(a)

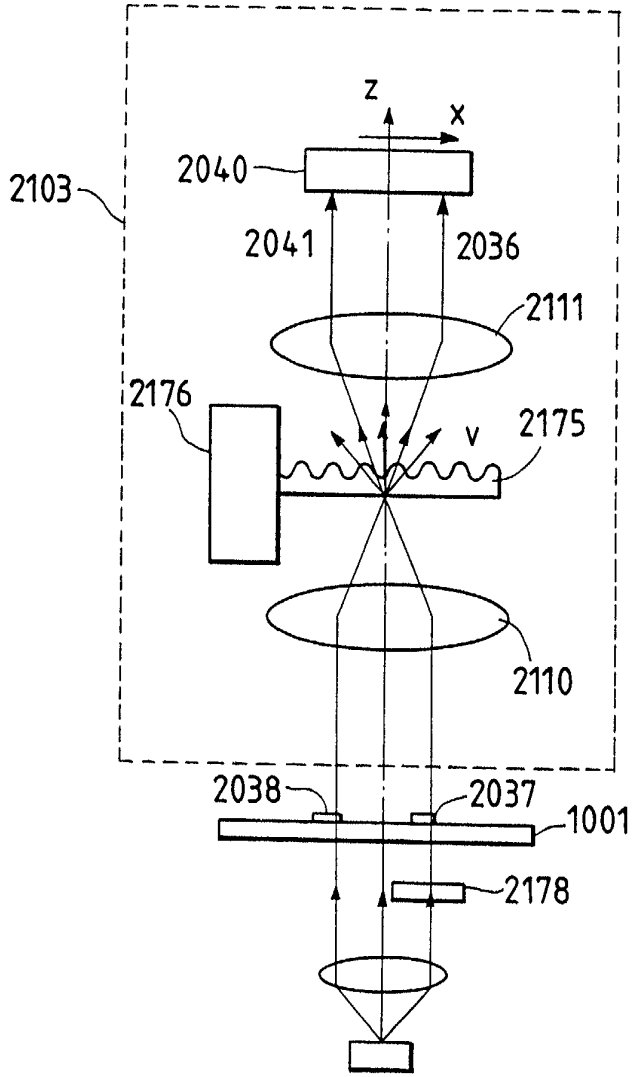


FIG. 42(b)

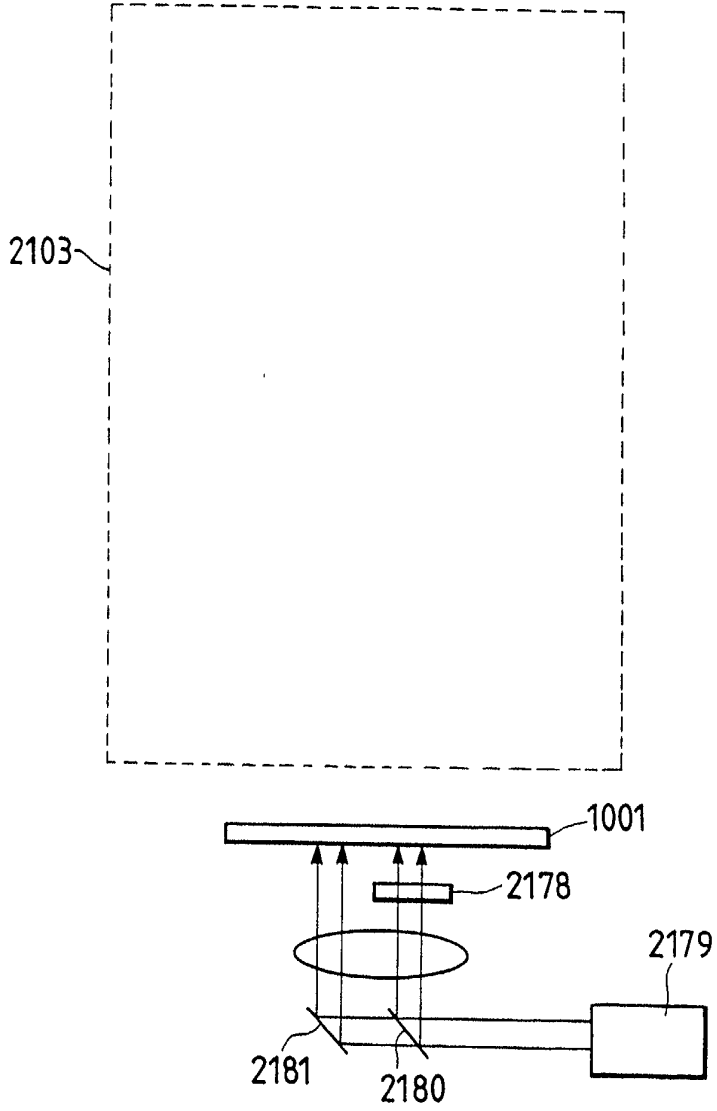
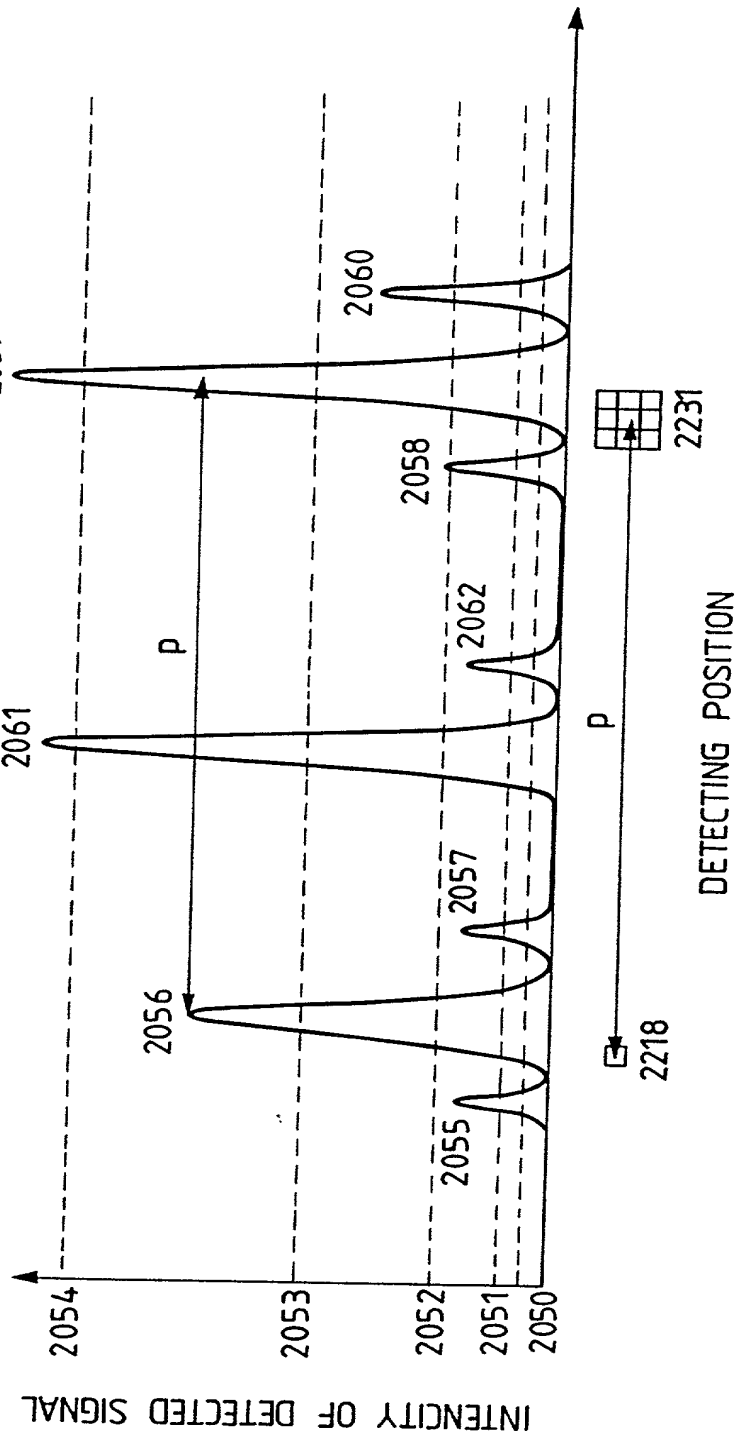


FIG. 43


INTENCITY OF DETECTED SIGNAL
2054
2053
2052
2051
2050
2059
2060
2061
2058
2062
2056
2057
2055
p
p
2231
2218
DETECTING POSITION